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Measurement of De Minimis Risk

Faucett (Jack) Associates, Inc., Chevy Chase, MD

Prepared for

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This study attempts to determine the existence of a de facto de minimis threshold as it is revealed by examining government activity with respect to low-level risks that are clearly visible and accurately measured. The study was restricted to the examination of government activity because society's concerns are reflected in risk-management decisions made by the government sector. Risk which are accepted by individuals because of the associated benefits derived from accepting the risk were considered poor candidate for revealing the current level of de minimis. This effectiviely eliminated from consideration most occupational risks, which are often accepted baded on cost-benefit criteria.

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Work Assignment No. 3

Prepared for:
OFFICE OF RADIATION PROGRAMS
U.S. ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C.

April 1985

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Technical direction and review of this study was provided by Mr. James Hardin and Dr. Byron M. Bunger of the Office of Radiation Programs, U.S. Environmental Protection Agency.

A MEASUREMENT OF *DE MINIMIS* RISK

I. INTRODUCTION

Society devotes substantial resources toward reducing the risk of premature death. In many cases, society's concerns result in government programs designed to reduce the level of risk, either directly via regulations, or indirectly via supported research. These government activities have produced large gains in life expectancy, reductions in associated morbidity costs, and increasing public awareness of the need for organized risk-management programs to reduce unacceptable levels of risk in many areas of our society. While the cost of these programs has been large, the benefits of reduced human suffering generally have been considered to be worth the costs.

During the past few decades, society has turned its attention toward an even larger number of relatively low-level risks, many of which have resulted from recent technological advances. Past success in control of high-level risks has led to the adoption of similar programs aimed at reducing these low-level risks, which are often less visible and difficult to control.

As society responds to risks at increasingly lower levels, a fundamental question arises: "Is there a level of risk, sufficiently low, that there is no need for societal activity to reduce the risk even lower?" This hypothetical threshold of risk frequently is referred to as the *de minimis*[1] level of risk. Below the *de minimis* level, it is reasonable to expect that efforts to reduce risk even further would cease.

This study attempts to determine the existence of a de facto *de minimis* threshold as it is revealed by examining government activity with respect to low-level risks that are clearly visible and accurately measured. The study was restricted to the examination of government activity because society's concerns are reflected in risk-management decisions made by the government sector. Risks which are accepted by individuals

[1] The use of the Latin term *de minimis* arises from the legal maxim, *de minimis non curat lex*, which translates loosely as "the law does not concern itself with *trifles*." The term *de minimis* is applicable to risk-management considerations in general. In the context of government activity, the term "below regulatory concern" is usually equivalent to *de minimis* when the risk-management activity explicitly or implicitly involves regulation.

because of the associated benefits derived from accepting the risk were considered poor candidates for revealing the current level of *de minimis*. This effectively eliminated from consideration most occupational risks, which are often accepted based on cost-benefit criteria.

This study found no evidence for the existence of a *de minimis* threshold. If a *de minimis* threshold does exist, we conclude that the current level of the threshold is below a lifetime probability of premature death of one in ten million, the lowest level of risks available for the analysis. There are serious data deficiencies which limit our ability to push this upper bound for *de minimis* to even lower levels.

Our procedures are described in Section II, our results in Section III, and our conclusions in Section IV.

II. STUDY DESIGN

Our study goal was to define *de minimis* risk in operational terms so that it could be estimated from existing data sources.

Our procedures for actually determining a societal *de minimis* level of risk are listed in the following steps:

1. select a large number of suitable candidate risks from existing data bases, then sample a managable number of candidate risks for detailed analysis;
2. contact cognizant government entities to document the current level of government activity that operates to reduce each risk; and
3. analyze the results to derive evidence for current *de minimis* risk level.

This section presents our approach to each of these steps in the analysis.

2.1 Definition of Study Goals

We define the term "*de minimis* risk" as a risk so low that society decides not to devote significant resources to reduce the risk to still lower values. This definition is taken as an axiomatic starting point - a generally acceptable expression of the *de minimis* concept. Such a definition is only useful if it can be expressed in operational terms; that is, in such a way that information can be collected from which the *de minimis* level of risk can be estimated. The following section indicates how we have tried to do this.

The term "risk" is operationally defined as the probability of death due to a defined cause, expressed as a "lifetime" probability. When many hundreds of million of people are at risk, even a risk that is very small when considered as a lifetime risk to a single individual can be measured in the sense that casualties are reported in standard mortality tables. The lifetime risk is then estimated as a unitless number, written for example as 2×10^{-6}. This example indicates that the probability of death due to the specified cause is 2 chances in one million. Expressed hypothetically, if an individual could live his life over again one million times, we would expect that two of those life spans could be shorter due to this cause. We find this approach preferable to expressing risk as a probability of death per year of life because most people are concerned with

the lifetime risk, not an annual risk, when the source of the risk is more or less evenly distributed over the individual's lifetime.

The term "society decides" is operationally defined as legislative government action (Federal, State, or Local) that commits funds to be used by the corresponding executive branches of government in a direct effort to control the risk. In effect, we are asking how society behaves when faced with a clearly visible risk, as expressed by representative government action to combat the risk. We cannot ask "experts" to decide the *de minimis* risk level because they may not express or reflect the majority view. We cannot ask average individuals what the *de minimis* level is because lifetime risk estimates, by themselves, are not part of practical experience.

The term "significant resources" means finding an item in a government budget that is directly and clearly traceable to the financing of an effort to reduce a risk. The "yes or no" question to be answered becomes: "Is there money committed to reduce the risk?" Attempting to relate the amount of resource commitment versus the level of risk is beyond the scope of this study.

The term "reduce the risk still lower" means that additional resources, on the balance, are directed towards lowering the risk; i.e., personnel and equipment are in place and in use in risk-reduction activities. When this is the case, it may be concluded that the *de minimis* level of risk is lower than the risk as it now exists. Often it is hard to distinguish between this risk-reduction effort and an effort that seems to be trying simply to maintain the status quo. However, the determination of a "status quo" effort is still a useful data point because the *de minimis* risk level should be equal to or less than the risk causing the status quo effort.

In summary, by looking at society's response to low-level risk, as expressed by government action or inaction, an estimate of *de minimis* risk should be possible. By looking at a large number of different kinds of risks at lower and lower risk levels, a *de minimis* threshold would be demonstrated if at some point society stopped trying to reduce the risk and simply tolerated it.

In practice, certain kinds of risks are more appropriate for the purpose of a *de minimis* determination than others. First, the risk should be visible - at least a few people must die as the result of the risk and a record must be kept of the number of deaths. We cannot look for society's decision on a risk that is invisible or conjectural. For very small risk levels, this means that a very large number of people must be exposed to the

risk to get a countable number of deaths. The risk must be more or less nation-wide in scope and fairly evenly distributed.

Second, the effort to reduce the risk should not be primarily based on a cost benefit decision. We are not trying to balance the risk some people are receiving against the benefits others may receive as the result of accepting the risk. Rather we want to look at risk separately and in isolation, as the definition to de *minimis* implies. This is a condition most difficult to meet in practice, but two classes of risk most closely approach this condition: non-occupational risks due to accidents and risks due to disease. Risks in these categories seem to have the least benefits associated with accepting them and, therefore, a decision to have resources committed to reducing them would reflect society's collective opinion about the acceptability of the risk level itself. In contrast, the acceptance of occupational risk and risk from environmental pollutants are examples of decisions that are usually based on implied benefits to some individuals balanced against risks to others, such that achieving a de *minimis* level of risk is not a primary objective. Risks due to sports activities or smoking are examples of an individual balancing his rewards from an activity against his risk. His behavior when faced with a risk that is not rewarding to him is expected to be different, and it is this second case that is of most interest for estimating the current level of de *minimis*.

2.2 Selection of Risks for Analysis

An initial attempt was made to assemble a candidate list of risks for analysis by collecting examples of low-level risk decisions by government agencies from newspapers, journals, and other published risk assessments. This procedure was abandoned for the following two reasons: 1) it was difficult to verify the published risk estimates which showed inconsistencies when estimates were compared across different sources; and 2) an unbiased method for selecting candidate risks could not be based on items drawn from popular media sources or by abstracting the results of risk assessment studies conducted by other investigators, because such a sample would tend to contain risks which are currently receiving attention.

An alternative approach was adopted which avoided the biases of overt selection and ensured that the level of each risk was estimated the same way. An initial list of candidate risks was assembled from the National Center for Health Statistics (NCHS)

data base on the causes of death in the U.S. for the years 1975-1980 inclusive. A first cut at the list of candidate risks for the study was obtained by selecting all disease and accident risks which averaged less than 500 deaths per year over the six year period. The NCHS data base employs a classification scheme which corresponds to the *Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death* (World Health Organization, Geneva, 1977). The International Classification is recommended by the World Health Organization as the basis for reporting international health and vital statistics. The classification was revised in 1975, and the NCHS data base was converted to the new classification scheme starting in 1979. All risks for which a continuous time series could not be constructed to bridge the change in classification were eliminated from consideration. The initial candidate list contained over 300 risks with continuous data over the six year period, each risk averaging under 500 deaths per year.

The initial candidate list was then screened to remove all cases of rapidly increasing or decreasing risk levels, which would prohibit an accurate assessment of the level of the risk by the decision makers. The list was also screened to eliminate occupational-related risks, self-inflicted or overtly voluntary risks (such as hang-gliding), transportation accidents, malignant neoplasms, and death due to assault, legal intervention, legal execution, or war operations. The first two categories were eliminated because society generally is thought to behave differently when regulating occupational and voluntary risks as contrasted to regulating risks with negligible associated benefits. The third and fourth categories were eliminated because government responses to traffic and cancer risks tend to cut across many individual risk categories in the data base. Application of the concept of *de minimis* to the final four categories is contrary to other legal tenets. During this phase of the study, risks with classifications such as "other disorders of the ..." or "late effects due to ...." were aggregated with the main risk category when such a match was feasible. Otherwise such risks were eliminated from consideration. Other ambiguous classifications also were eliminated at this stage. The final candidate list included 35 accidents and 180 disease risks which survived the screening process.

Due to contraints on project resources, the study group decided to sample 25 accident risks and 30 diseases for further study. These were obtained by selecting or deleting every n^{th} risk from the lists of accidents and diseases, which were first sorted by increasing level of risk. Sampling every n^{th} ordered risk retained the properties of the

original data base which contained a higher population of risks at lower risk levels. The sampling method was preferred over overt selection of "interesting" risks from the list to avoid any conscious or unconscious biases due to recent publicity or staff familiarity with the status of government activity regarding any particular set of risks.

2.3 Determination of Government Activity to Reduce the Selected Risks

Following the selection of risks for analysis, we began the task of determining the existence of significant government activity designed to reduce the risk. For this task, the two sets of risks, accidents and diseases, presented different types of problems. However, there were also several common questions which were addressed similarly for both sets. These common questions will be discussed first.

Many of the problems which arose in the development of procedures for determining the presence or absence of government activity are connected with the methodology for selecting risks for analysis, i.e., the use of a data base employing the *International Statistical Classification* . The classification scheme for identification of the causes of death groups sets of similar, yet distinct, risks. While the disease groupings are based on the type of disease mechanism, and accidents by similarity of circumstances leading to the event, not all groupings contain risks over which only a single government entity may have cognizance. The problem is illustrated by the following two examples:

1) schizophrenic psychoses (295)[1]; and
2) accidents caused by cutting and piercing instruments or objects (E920).

Schizophrenic psychoses are the subject of research efforts in biochemistry, genetics, clinical psychology and other areas which are supported by a variety of government agencies. The same was found true for accidents due to cutting or piercing instruments, which includes power tools and lawn mowers, as well as knives and arrows.

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[1] The International Classification number is enclosed in parentheses. The prefix "E", which applies only to accidents, denotes that the accident classification is by the external cause (for example, fall from a ladder). The classification scheme also groups accidental deaths by the internal cause (for example, fracture of skull). Our study used only the external classifications.

We suspected cognizance by a single agency, the Consumer Product Safety Commission, but further analysis shows that many industry standards are maintained by a quasi-private entity, the American National Standards Institute (ANSI). Problems such as these were found during investigation of many of the risk categories. The Appendix to this report contains a summary fact sheet for each risk, which discusses the resolution of specific problems presented in its assessment.

A most important question was a practical definition of the term "significant level of government activity." The limited resources available for the study prohibited the collection of actual cost data for each risk. The development of detailed cost data, even for the small number of risks selected for this study, would to be a very difficult and resource-intensive task. In a few cases, government or private agencies have already completed cost estimates for narrow areas of a risk category. When such information was readily obtainable, the data are included in the fact sheets.

As actual cost data were not developed for each risk, the definition of a significant level of activity was addressed categorically. A determination of activity or no activity was made by establishing a threshold level of activity appropriate to the type of risk under consideration. In general, for disease risks, the existence of a research program conducted or funded by the Center for Disease Control or the National Institutes of Health was considered a significant level of activity. For accidents, the existence of a regulation or standard designed to control the risk was taken as evidence that a significant amount of government activity was involved. Where specific regulations were not apparent for a risk category, the existence of other pragmatic risk-prevention programs, such as the National Severe Storms Center activities for severe storm warnings, were taken as evidence of significant government risk-reduction activity. If a government agency was engaged only in the collection and publication of information on a risk category, without evidence of direct risk-reduction activity, this was not considered a significant level of government activity. However, many government agencies responsible for collecting and publishing data on the extent of certain risks also publish educational material which informs the public of the risk and suggests preventative measures. These informational activities were considered a significant level of activity if a substantial portion of the affected population received these materials. The water safety education/information programs by the U.S. Coast Guard concerning safety procedures for prevention of fire and explosion on watercraft are examples.

Rabies (071) is an example of a third general problem in the determination of significant government activity: "Is the activity designed to prevent future outbreaks of rabies, to maintain the status quo, or to lower the current risk due to rabies?" The now traditional domestic animal vaccination programs are examples of measures designed to maintain the status quo. The existence of these programs provides evidence that the *de minimis* threshold is less than or equal to the current risk of human rabies. But new programs to monitor and control epizootic rabies in sylvan populations are considered to reduce the risk of rabies in domestic animals and to thereby reduce the risk of human rabies. The existence of these new programs provides evidence that the *de minimis* threshold is below the current risk of rabies. This conclusion is based on the fact that the new sylvatic animal programs are justified on the grounds that they will reduce the current risk of human rabies, in addition to the objective of reducing the risk of epizootic rabies, from which a much higher level of human risk would result.

In the general case, the decision-maker must use not only the recent history of the risk level, but also estimates of what the current and future level of risk would be with and without the past, current, and planned future risk-management activities occurring. Again taking rabies as an example, one may argue that today's level of risk is very low only because successful animal control/pet vaccination programs were conducted in the past. Hence, the level of risk measured over the past six years is the level associated with a given level of government activity. If control programs continue at current levels, there is no reason to expect that significant reduction will occur in today's risk level. In cases such as these, there may be significant government and private activity of an ongoing nature that logically cannot be expected to reduce the level of the risk. In this study, these ongoing expenditures are referred to as activities designed to maintain the status quo.

Risk management is probably a dynamic process. Reductions in government activity lead to higher levels of risk, while increases in government activity are expected to lead to lower levels of risk. Ongoing expenses involved in the continuation of current programs are often necessary to maintain the current equilibrium. But a dynamic model would require more careful assessment of the government activity beyond the question of the existence of a significant level of current expenditures. Determination of the effects of changes in the level of activity on the level of risk would be necessary. The complete model would also include an analysis of the time lag between the change in government activity and the response of the observed level of risk.

Lacking detailed information on the actual mechanisms of risk prevention, their rates of adoption, and the degree of success of each activity, we could not develop a dynamic model of government risk management. The careful distinctions required to develop a dynamic theory serve a useful purpose for this study, however, because they have led us to make the following decisions:

1. risks with rapidly changing levels of risk over the six years of data were eliminated from consideration while preparing the final candidate list;

2. simple continuation of older programs and measures was defined as maintaining the status quo;

3. the existence of a new regulation, new prevention measure, or funding of research to enable new measures was considered evidence of activity designed to reduce the level of risk; and

4. the cut-off point for "new" activities was selected as the year 1975, the first year selected from the mortality data base for estimating average annual mortality.

2.4 Measurement of *De Minimis* Risk

The results of the analyses described above will include the risk level and the level of government activity for 25 accident and 30 disease risk categories, selected randomly from the initial set of candidate risks. If the *de minimis* threshold exists within the range of selected risks, we would expect to see a noticeable decline in the tendency toward government risk-reduction activity at lower levels of risk. This tendency in the results may be demonstrated by a variety of statistical methods, including graphical analysis, tabular display by risk interval, and hypothesis tests based on estimated statistical models, such as the logistic regression model. In the following section each of the three methods is applied to search for evidence of a *de minimis* threshold within the range of risks selected for analysis.

III RESULTS

3.1 Selection and Measurement of Risks for Analysis

The final set of risks selected for this analysis is shown in Exhibits 3-1(a) and 3-1(b). The exhibits show the risk number assigned for this study, the International Classification category for the risk with a terse description, the annual deaths reported in the NCHS data base, and the average annual death rate over the six years of data. The exhibit also shows our estimates of the annual and lifetime probability of premature death due to each risk. The annual probabilities were computed by dividing the average annual death rate by the 1980 U.S. population of 230 million. The lifetime probabilities were calculated by multiplying the annual probability by the expected life of an individual, which is 72 years. These calculations assume that the entire population is at risk, and that the level of risk is relatively constant throughout the lifetime of an individual.

The accident definitions are largely self-explanatory. However, as many of the diseases may be unknown to the reader, an accompanying Appendix may be consulted for more specific information on each risk. (For further details on the accident and disease categories used in this study, see the *Manual of the International Statistical Classification of Disease, Injuries and Causes of Death.*)

The level of risks selected for analysis range from a lifetime probability of approximately one in ten million up to one in seven thousand. For the 1980 U.S. population of 230 million, this range of risk levels translates into an annual death rate of approximately 0.3 to 500 deaths per year. The annual probability of premature death for the average individual in the U.S. ranges from 1.4 in a billion up to 2 in a million for these risks. The levels of selected risks are shown in Exhibit 3-2.

The risk with the highest level selected for analysis was death due to falls on the same level from slipping, tripping or stumbling (an average of 470 deaths per year in the U.S.), while the lowest level of risk occurred for three risks: relapsing fever, prompt effects of accidental exposure to radiation, and testicular dysfunction (each at two deaths in the six most recent years of available data for the U.S.). This range includes

EXHIBIT 3-1(a):

FINAL 25 ACCIDENT RISKS SELECTED FOR ANALYSIS

Risk Number	International Classification Category	Description	Deaths Per Year (U.S.) 1975	1976	1977	1978	1979	1980	Average	Probability of Premature Death* Annual	Lifetime
A-1	E926	Exposure to radiation	0	0	0	0	0	2	0.33	.001	.1
A-2	E837.3	Explosion, fire or burning in watercraft	7	0	2	2	1	1	2.17	.009	.7
A-3	E801.3	Railway accident involving collision with pedal cyclist	5	8	2	5	3	2	4.17	.018	1.3
A-4	E865	Accidental poisoning from foodstuffs and poisonous plants	6	6	7	1	7	13	6.67	.029	2.1
A-5	E861	Accidental poisoning by cleansing and polishing agents, disinfectants, paints and varnishes	11	6	6	6	14	15	9.67	.042	3.0
A-6	E864	Accidental poisoning by corrosives and caustics not components of disinfectants	16	22	17	17	16	18	17.67	.077	5.5
A-7	E930	Adverse reaction to antibiotics	27	20	23	15	26	24	22.50	.098	7.0
A-8	E897	Accident caused by controlled fire not in building or structure	18	28	20	35	17	26	24.00	.104	7.5
A-9	E909	Cataclysmic earth surface movements and eruptions	24	19	49	26	14	43	29.17	.127	9.1
A-10	E905	Venomous animals and plants as the cause of poisoning and toxic reactions	50	53	55	62	50	47	52.83	.230	16.5
A-11	E862	Accidental poisoning by petroleum products, other solvents and their vapours	54	45	52	40	74	62	54.50	.237	17.1

Note: (*) — Chances per million.

EXHIBIT 3-1(a):

FINAL 25 ACCIDENT RISKS SELECTED FOR ANALYSIS — (Continued)

Risk Number	International Classification Category	Description	Deaths Per Year (U.S.) 1975	1976	1977	1978	1979	1980	Average	Probability of Premature Death* Annual	Lifetime
A-12	E915	Foreign body accidentally entering bodily orifice (including eye, E914)	72	65	50	51	66	52	59.33	.26	18.6
A-13	E921	Accident caused by explosion of pressure vessel	64	69	58	66	64	71	65.33	.28	20.5
A-14	E892	Conflagration not in building or structure	58	85	75	70	74	66	71.33	.31	22.3
A-15	E907	Lightning	124	81	116	98	87	94	100.00	.44	31.3
A-16	E867	Accidental poisoning by gas distributed by pipeline	116	129	109	111	92	61	103.00	.45	32.2
A-17	E894	Ignition of highly inflammable material	146	153	163	135	113	105	135.83	.59	42.5
A-18	E920	Accidents caused by cutting and piercing instruments or objects	140	135	127	142	136	143	137.17	.60	42.9
A-19	E908	Cataclysmic storms, and floods resulting from storms	103	212	202	125	144	75	143.50	.62	44.9
A-20	E883	Fall into hole or other opening in surface	137	140	155	146	132	160	145.00	.63	45.4
A-21	E924	Accident caused by hot substance or object, caustic or corrosive material and steam	209	210	181	202	192	194	198.00	.86	62.0
A-22	E904	Hunger, thirst, exposure, neglect	257	247	264	276	378	415	336.17	1.33	95.8

Note: (*) — Chances per million.

EXHIBIT 3-1(a):

FINAL 25 ACCIDENT RISKS SELECTED FOR ANALYSIS (Continued)

Risk Number	International Classification Category	Description	Deaths Per Year (U.S.) 1975	1976	1977	1978	1979	1980	Average	Probability of Premature Death* Annual	Lifetime
A-23	E893	Accident caused by ignition of clothing (not caused by highly inflammable material or conflagration)	429	425	376	324	289	311	359.00	1.56	112.4
A-24	E923	Accident caused by explosive material	389	442	439	361	345	339	385.83	1.68	120.8
A-25	E885	Fall on same level from slipping, tripping or stumbling	513	483	487	477	454	406	470.00	2.04	147.1

Note: (*) — Chances per million.

EXHIBIT 3-1(b):

FINAL 30 DISEASE RISKS SELECTED FOR ANALYSIS

Risk Number	International Classification Category	Description	Deaths Per Year (U.S.) 1975	1976	1977	1978	1979	1980	Average	Probability of Premature Death* Annual	Lifetime
D-1	087	Relapsing fever	1	0	0	0	0	1	0.33	.001	.1
D-2	257	Testicular dysfunction	0	0	0	0	1	1	0.33	.001	.1
D-3	007.1	Giardiasis	0	1	0	0	1	2	0.67	.003	.2
D-4	470	Deflected nasal septum	1	1	0	0	0	3	0.83	.004	.3
D-5	110	Dermatophytosis	1	1	2	2	0	1	1.17	.005	.4
D-6	071	Rabies	2	1	0	2	4	0	1.50	.007	.5
D-7	652	Malposition and malpresentation of fetus	1	2	5	1	1	1	1.83	.008	.6
D-8	684	Impetigo	3	1	2	3	3	2	2.33	.010	.7
D-9	122	Echinococcosis	3	5	2	3	2	4	3.17	.014	1.0
D-10	744	Congenital anomalies of ear, face, and neck	4	5	6	0	1	7	3.83	.017	1.2
D-11	072	Mumps	8	8	5	3	2	2	4.67	.020	1.5
D-12	256	Ovarian dysfunction	13	5	10	7	5	0	6.67	.029	2.1
D-13	522	Acute apical periodontitis of pulpal origin (522.4), and periapical abscess without sinus (522.5)	6	9	11	7	12	10	9.17	.040	2.9
D-14	056	Rubella	21	12	17	10	1	1	10.33	.045	3.2
D-15	604	Orchitis and epididymitis	13	16	10	10	8	10	11.17	.049	3.5

Note: (*) — Chances per million.

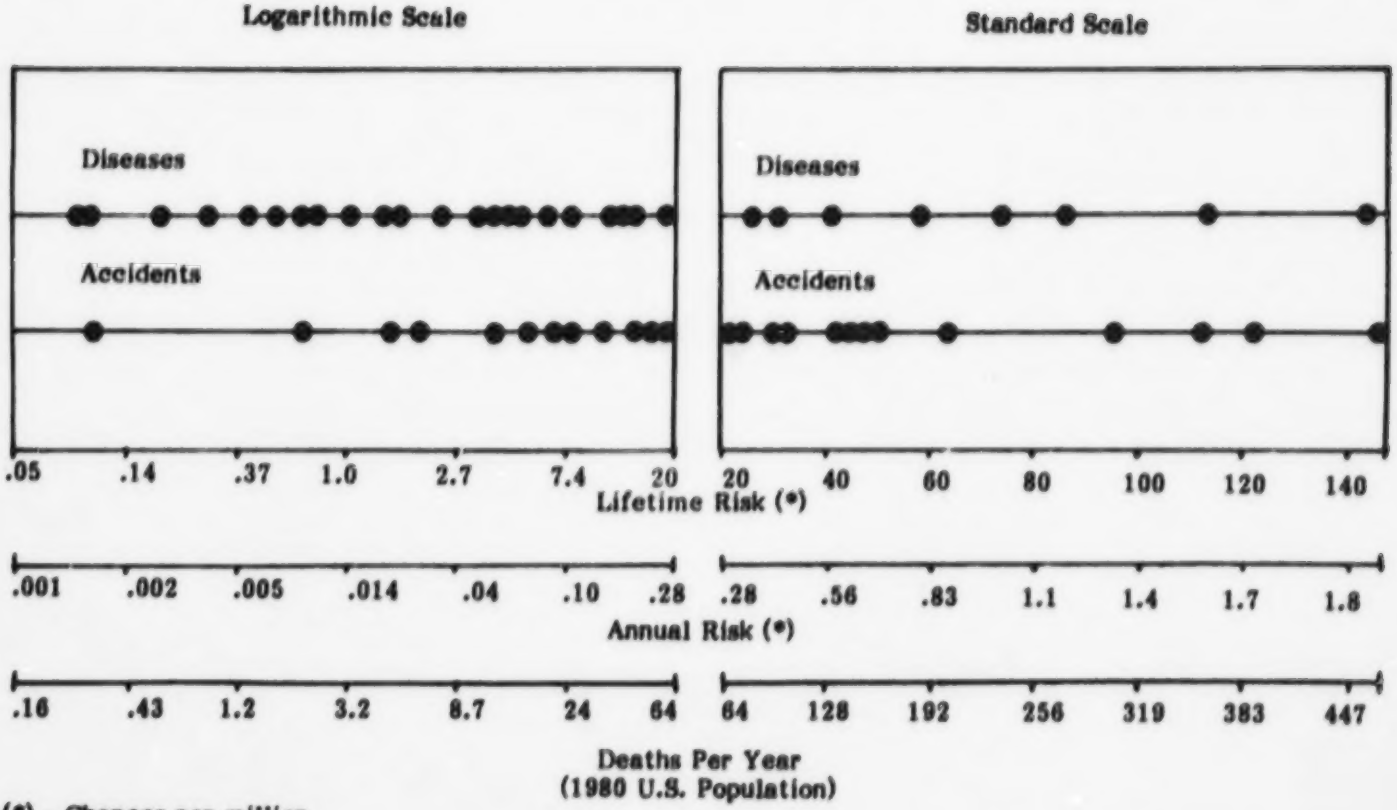
EXHIBIT 3-1(b):

FINAL 30 DISEASE RISKS SELECTED FOR ANALYSIS (Continued)

Risk Number	International Clasification Category	Description	Deaths Per Year (U.S.) 1975	1976	1977	1978	1979	1980	Average	Probability of Premature Death* Annual	Lifetime
D-16	460	Acute nasopharyngitis (common cold)	14	21	13	17	11	13	14.83	.06	4.6
D-17	004	Shigellosis	27	19	25	20	19	15	20.83	.09	6.5
D-18	216	Benign neoplasm of skin	14	22	27	30	26	27	24.33	.11	7.6
D-19	017	Tuberculosis of other organs	32	30	37	40	31	34	34.00	.15	10.6
D-20	015	Tuberculosis of bones and joints	36	29	37	37	42	45	37.67	.16	11.8
D-21	220	Benign neoplasm of ovary	60	59	60	41	19	17	42.67	.19	13.4
D-22	027.0	Listeriosis	62	64	55	67	54	76	63.00	.27	19.7
D-23	483	Pneumonia due to Eaton's agency, mycoplasma, and pleuropneumonia-like organisms	92	80	70	71	77	91	80.17	.35	25.1
D-24	536	Disorders of function of stomach	94	85	101	90	92	115	96.17	.42	30.1
D-25	295	Schizophrenic psychoses	112	112	118	103	150	165	126.66	.55	39.7
D-26	737	Curvature of spine	163	167	173	208	173	201	180.83	.79	56.6
D-27	595	Cystitis	262	224	250	218	200	205	226.50	.98	70.9
D-28	323	Encephalitis, myelitis, and encephalomyelitis	309	277	232	250	266	270	268.50	1.17	84.1
D-29	036	Meningococcal infection	308	330	338	403	404	387	361.67	1.57	113.2
D-30	570	Acute and subacute necrosis of liver	513	448	396	408	454	523	457.00	1.99	143.1

Note: (*) — Chances per million.

EXHIBIT 3-2:
ESTIMATED RISK LEVELS OF ACCIDENTS AND DISEASES SELECTED FOR ANALYSIS



Note: (*) - Chances per million.

the levels most commonly suggested for a *de minimis* threshold.[1,2] The selected risks also include some relatively well-known examples which serve to provide the reader with a personal perspective on the levels of risk under consideration: mumps (5 deaths per year, or a lifetime risk of 1.6 in a million), earthquakes and volcanic eruptions (29 deaths per year, or a lifetime risk of 9 in a million), and lightning (a relatively high risk for this study at 100 deaths per year, or a lifetime risk of 31 in a million).

The assessment of government activity for the accident risks required a larger number of contacts to determine the government agencies which were responsible for managing each risk. Responsible agencies were then contacted to determine the current level of government activity for each risk category. The disease risks are largely the responsibility of agencies of the Department of Health and Human Services, in particular the National Institutes of Health (NIH) and the Center for Disease Control (CDC). The centralization of responsibility for disease prevention and control in these two agencies greatly simplified the analysis task for the disease risks. Our procedures for evaluating government activity for accidents is discussed first, followed by a briefer discussion for diseases.

3.2 Assessment of Government Activity for Accident Risks

The accident risks include recreational accidents, poisonings by a variety of substances, natural disasters, and fire or explosion. Also included are several common accidents involving falls or penetrating wounds, as well as the broad category of hunger, thirst, exposure and neglect. These risks may arise in many areas of everyday human activity. Depending on the specific circumstances surrounding the accident, a large number of government agencies may be involved in controlling the risk. Our general procedure for determining government involvement with a particular risk consisted of a large number

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[1] Richard Wilson and Edmund Crouch (1982) report that the following thresholds for *de minimis* have been suggested: occupational risk — 1 in 100,000 per year (1 in 1400 lifetime); individual general public risk — 1 in 1,000,000 per year (1 in 14,000 lifetime); and total societal impact — 10 deaths per year (1 in 300,000 lifetime). Risk/Benefit Analysis, Ballinger Publishing Co., Cambridge, Mass., pages 104-105.

[2] In preparing the risk assessments required under the Delaney Act, the Food and Drug Administration (FDA) has applied the *de minimis* concept in its analyses of the risk presented by food additives. While the Act requires that certain additives are permissible only if there is no measurable residue at the time of consumption, in Monsanto Co. v. Kennedy (D.C. Cir.) 613 F. 21947 (1979), the FDA applied a *de minimis* threshold of one in a million lifetime risk for establishing permissible levels.

of telephone contacts to locate individuals who were aware of government activities in each area.

Exhibit 3-3 shows the agencies which were involved in risk-management activities for each type of accident along with a terse description of the Act, regulation, standards, or other risk management activity, as appropriate. In addition, summary fact sheets were prepared for each risk (Appendix A). The fact sheets contain supplemental information collected from government agencies which is necessary for a complete assessment of each risk.

The data in the fact sheets were analysed to determine if a significant level of risk-reduction activity was apparent, if the activity simply was an extension of the status quo, or if no significant activity could be documented. A summary of these results is presented in Exhibit 3-4. Risk categories, risk descriptions, and risk levels from Exhibit 3-1 are presented with an indication of the level of government risk-management activity. Government activity is indicated by one of three classifications: no significant activity; activity which maintains the status quo; and significant activity that is designed to lower the level of risk. These three classifications are abbreviated in the exhibit as "none", "status quo", and "significant", respectively.

In Exhibit 3-4, there are 15 accident risk categories (60 percent) for which significant risk-reduction activity is apparent, 8 categories (32 percent) for which current activities seemed to be designed to maintain the status quo, and 2 categories (8 percent) for which no risk-reduction activity could be documented. In Exhibit 3-5, which consolidates the results into risk intervals, there is no suggestion of a tendency towards *de minimis* government activity for the low level risks as compared to the higher level risks. Almost 80 percent of the categories below a lifetime risk level of 10 in a million were determined to have significant government activity designed to reduce the level of risk. Over 90 percent of all accident risks were assessed as having significant activity or maintaining the status quo.

3.3 Assessment of Government Activity for Disease Risks

The disease risks include the following categories: primary and secondary viral and bacterial infections; parasitic, fungal, and protozoan infestations; congenital and

EXHIBIT 3-3:
SUMMARY OF GOVERNMENT ACTIVITY FOR ACCIDENT RISKS

Risk Number	Category	Description	Sub-Area	Cognizant Agency	Relevant Regulations/Standards/Activities
A-1	E926	Exposure to radiation	(a) Microwaves	Microwave Branch, Federal Communications Commission	American National Standards Institute (ANSI).
			(b) Ultraviolet	Food and Drug Administration (FDA)	Code of Federal Regulations (CFR), Title 21, Chapter I, Part 1040.
			(c) Ionizing radiation	Nuclear Regulatory Commission and the Environmental Protection Agency	CFR, Title 10, Chapter I, Parts 30-36 and 61.
A-2	E837.3	Explosion, fire, or burning in watercraft	N/A	U.S. Coast Guard	CFR, Title 33, Part 183.
A-3	E801.3	Railway accident involving collision with pedal cyclist	N/A	Federal Railroad Administration	None.
A-4	E865	Accidental poisoning from foodstuffs and poisonous plants	(a) Packaging, additives, and contaminants	FDA	Food Manufacturers Practices, Sanitation Standards.
			(b) Prompt treatment	Poison Control Centers (State and local)	Information Service and Hotline.
			(c) Meat and poultry	Food Safety and Inspection Service, U.S. Department of Agriculture (USDA)	Federal Meat Inspection and Poultry Products Inspection Acts.
A-5	E861	Accidental poisoning by cleansing and polishing agents, disinfectants paints and varnishes	(a) Cleansing and polishing agents	Consumer Product Safety Commission (CPSC)	CFR, Chapter 2, Subchapter E, Part 1700.
			(b) Lead in paint	CPSC	Consumer Product Safety Act.
A-6	E864	Accidental poisoning by corrosives and caustics not components of disinfectants	N/A	CPSC	Federal Caustic Poison Act.
A-7	E930	Adverse reaction to antibiotics	N/A	National Institute of Allergy and Infectious Diseases	None.
A-8	E897	Accident caused by controlled fire not in building or structure	(a) Federal lands	U.S. Forest Service and Aviation and Fire Management Division, USDA	Fire Prevention Programs.
			(b) Private property	Federal Emergency Management Agency (FEMA) and U.S. Fire Administration	Fire Prevention Programs.
A-9	E909	Cataclysmic earth surface movements and eruptions	(a) Earthquake	U.S. Geological Survey with FEMA and 21 other Federal agencies	Earthquake Hazards Reduction Act and Earthquake Hazards Reduction Program.
			(b) Volcano	U.S. Geological Survey	Volcano Hazards Program.
			(c) Collapse of dams	Soil Conservation Service, USDA	Dam Safety Program.

EXHIBIT 3-3:

SUMMARY OF GOVERNMENT ACTIVITY FOR ACCIDENT RISKS (Continued)

Risk Number	Category	Description	Sub-Area	Cognizant Agency	Relevant Regulations/Standards/Activities
A-10	E905	Venomous animals and plants as the cause of poisoning	(a) Toxic insect bites (b) General	Public Health Service, NIH Poison Control Centers (State and local)	Research and treatment protocols. Informational activities.
A-11	E862	Accidental poisoning by petroleum products, other solvents and their vapours	(a) Petroleum distillates (b) General	CPSC Poison Control Centers (State and local)	Hazardous Substance Act. Informational activities.
A-12	E915	Foreign body accidentally entering bodily orifice (including eye)	(a) Eye (b) General	National Eye Institute, NIH CPSC	None. Requires notice suggesting eye protection for operating certain devices.
A-13	E921	Accident caused by explosion of pressure vessel	(a) Aerosol cans (b) Automobile tires (c) General	CPSC National Highway Traffic Safety Administration None — voluntary standards	Hazardous Substance Act requires proper labelling. Safety Standards. American Society of Mechanical Engineers (ASME) Pressure Vessel Code.
A-14	E892	Conflagration not in building or structure	N/A	Forest Service, USDA	Cooperative Forestry Assistance Act.
A-15	E907	Lightning	N/A	National Oceanic and Atmospheric Administration (NOAA)	Safety information.
A-16	E867	Accidental poisoning by gas distributed by pipeline	N/A	None — voluntary standards	Voluntary industry standards developed by the American National Testing Institute and adopted by the American Gas Association.
A-17	E864	Ignition of highly inflammable material	(a) Portable gasoline containers (b) General	CPSC None — voluntary standards	Federal labelling requirements. Flammable and Combustible Liquids Code, Container and Portable Tank Storage, Chapter 4, was developed by the National Fire Protection Association as an advisory code. Local jurisdictions may adopt all, part, or none of the code.
A-18	E920	Accidents caused by cutting and piercing instruments or objects	(a) Powered lawnmowers (b) Powered hand tools	CPSC None — voluntary standards	Federal standards established. Voluntary industry standards developed by the American National Standards Institute (ANSI).

EXHIBIT 3-3:
SUMMARY OF GOVERNMENT ACTIVITY FOR ACCIDENT RISKS (Continued)

Risk Number	Category	Description	Sub-Area	Cognizant Agency	Relevant Regulations/Standards/Activities
A-19	E908	Cataclysmic storms, and floods resulting from storms	(a) Warning systems (b) Local preparedness	National Weather Service, NOAA FEMA	Severe Weather Branch, Severe Storm Center, and 350 local offices. Provides matching funding for local emergency preparedness/response.
A-20	E883	Fall into hole or other opening in surface	(a) Federal (b) State and local	Occupational Safety and Health Administration Departments of Public Works	Standard for making construction sites, mines, quarries, docks, and tanks safe for workers and the general public. Controls for manholes, public and private swimming pools.
A-21	E924	Accident caused by hot substance or object, caustic or corrosive material and steam	(a) Caustics (b) Kerosene heaters (c) General	CPSC CPSC None	Hazardous Substance Act requires labelling. Home Heating Information Program. None.
A-22	E904	Hunger, thirst, exposure, neglect	(a) Hunger and thirst (b) Exposure and neglect-children (c) Exposure and neglect-general	Food and Nutrition Service, USDA Department of Health and and Human Services None	Food Stamp, Food Distribution, National School Lunch, School Breakfast, Child Care Food, Summer Food Service, Special Milk Programs. Child Abuse and Neglect Laws. None
A-23	E893	Accident caused by ignition of clothing (not caused by highly inflammable material or conflagration)	N/A	CPSC	Flammable Fabrics Act.
A-24	E923	Accident caused by explosive material	N/A	Compliance Operations Section, Bureau of Alcohol, Tobacco, and Firearms	Federal Law Relating to Explosives, U.S. Code Vol. 18, Chapter 40.
A-25	E885	Fall on same level from slipping, tripping or stumbling	(a) Elderly (b) General	National Institute on Aging, NIH State and local jurisdictions	Education/information activities. Street and sidewalk repairs and resurfacing.

EXHIBIT 3-4:

DETERMINATION OF GOVERNMENT ACTIVITY FOR ACCIDENT RISKS

Risk Number	International Classification Category	Description	Annual Deaths	Probability of Premature Death* Annual	Probability of Premature Death* Lifetime	Level of Government Activity
A-1	E926	Exposure to radiation	0.33	.001	.1	Significant
A-2	E837.3	Explosion, fire or burning in watercraft	2.17	.009	.7	Significant
A-3	E801.3	Railway accident involving collision with pedal cyclist	4.17	.018	1.3	None
A-4	E865	Accidental poisoning from foodstuffs and poisonous plants	6.67	.029	2.1	Significant
A-5	E861	Accidental poisoning by cleansing and polishing agents, disinfectants, paints and varnishes	9.67	.042	3.0	Significant
A-6	E864	Accidental poisoning by corrosives and caustics not components of disinfectants	17.67	.077	5.5	Significant
A-7	E930	Adverse reaction to antibiotics	22.50	.098	7.0	Status Quo
A-8	E897	Accident caused by controlled fire not in building or structure	24.00	.104	7.5	Significant
A-9	E909	Cataclysmic earth surface movements and eruptions	29.17	.127	9.1	Significant
A-10	E905	Venomous animals and plants as the cause of poisoning and toxic reactions	52.83	.230	16.5	Significant
A-11	E862	Accidental poisoning by petroleum products, other solvents and their vapours	54.50	.237	17.1	Significant

Note: (*) — Chances per million.

EXHIBIT 3-4:

DETERMINATION OF GOVERNMENT ACTIVITY FOR ACCIDENT RISKS — (continued)

Risk Number	International Classification Category	Description	Annual Deaths	Probability of Premature Death* Annual	Probability of Premature Death* Lifetime	Level of Government Activity
A-12	E915	Foreign body accidentally entering bodily orifice (including eye, E914)	59.33	.26	18.6	Status Quo
A-13	E921	Accident caused by explosion of pressure vessel	65.33	.28	20.5	Status Quo
A-14	E892	Conflagration not in building or structure	71.33	.31	22.3	Significant
A-15	E907	Lightning	100.00	.44	31.3	Status Quo
A-16	E867	Accidental poisoning by gas distributed by pipeline	103.00	.45	32.2	None
A-17	E894	Ignition of highly inflammable material	135.83	.59	42.5	Status Quo
A-18	E920	Accidents caused by cutting and piercing instruments or objects	137.17	.60	42.9	Status Quo
A-19	E908	Cataclysmic storms, and floods resulting from storms	143.50	.62	44.9	Significant
A-20	E883	Fall into hole or other opening in surface	145.00	.63	45.4	Significant
A-21	E924	Accident caused by hot substance or object, caustic or corrosive material and steam	198.00	.86	62.0	Status Quo
A-22	E904	Hunger, thirst, exposure, neglect	306.17	1.33	95.8	Significant

Note: (*) — Chances per million.

EXHIBIT 3-4:
DETERMINATION OF GOVERNMENT ACTIVITY FOR ACCIDENT RISKS — (continued)

Risk Number	International Classification Category	Description	Annual Deaths	Probability of Premature Death*		Level of Government Activity
				Annual	Lifetime	
A-23	E893	Accident caused by ignition of clothing (not caused by highly inflammable material or conflagration)	359.00	1.56	112.4	Significant
A-24	E923	Accident caused by explosive material	385.83	1.68	120.8	Significant
A-25	E885	Fall on same level from slipping, tripping or stumbling	470.00	2.04	147.1	Status Quo

Note: (*) — Chances per million.

EXHIBIT 3-5:
GOVERNMENT ACTIVITY FOR ACCIDENTS, BY INTERVALS OF RISK

Percentages of categories are shown in parentheses; numbers may not add due to rounding.

Lifetime Probability of Premature Death (chances per million)	Number of Categories	Level of Government Activity		
		None	Status Quo	Significant
0.1 to 1	2	0 (0)	0 (0)	2 (100)
1 to 10	7	1 (14)	1 (14)	5 (71)
10 to 50	11	1 (9)	5 (45)	5 (45)
50 to 500	5	0 (0)	2 (40)	3 (60)
TOTALS	25	2 (8)	8 (32)	15 (60)

acquired malformations and dysfunctions; and a mental disorder. Unlike the accident risks, where cognizance and responsibility are frequently shared by more than one agency, Federal authority for disease risks rests with the Centers for Disease Control and the National Institutes of Health within the Department of Health and Human Services. Thus, we were able to determine if there is significant government activity directed at reducing or eliminating these disease risks through conversations with personnel at the Centers for Disease Control and the National Institutes of Health.

Two criteria were used to determine whether a significant level of government activity exists for each risk. The first was whether there is current funding of a research program directed at improving the diagnosis, treatment, or prevention of the disease. Where such a program was identified by cognizant personnel and verified by reference to *Research Awards - 1983* (U.S. Department of Health and Human Services, National Institutes of Health, Division of Research Grants, Bethesda, MD, March 1984), this was taken as sufficient to indicate a significant level of government activity dedicated to reducing the risk. The fact sheets for the diseases give specific information on the major objectives and relative sizes of the various programs.

The second criterion, used when we could find no evidence of currently funded research, consisted of determining whether or not there was an ongoing Federal program to disseminate public health information and advice relevant to the disease, or to monitor occurrences of the disease to direct public health care services to specific areas of concern. As in the case of research funding, evidence of such efforts was taken as sufficient to establish a significant level of government activity to reduce risk. Funding for the continuation of past risk-management programs was taken as evidence that, at a minimum, the status quo is being maintained. If no evidence of currently funded research or an ongoing public health program could be found, it was taken as evidence that there is no significant level of Federal government activity.

As indicated in Exhibit 3-6, our analysis concluded that there was documented Federal activity designed to eliminate or reduce the risk of death by disease for all but one disease risk category - acute apical periodontitis (D-13). No apparent activity could be found for this disease, which seldom causes death except through secondary infections. For all other disease risks, Federal programs to reduce the risk were identified. These results are summarized in Exhibit 3-7, which shows that all but one disease category is classified as having significant government activity.

EXHIBIT 3-6:

DETERMINATION OF GOVERNMENT ACTIVITY FOR DISEASE RISKS

Risk Number	International Classification Category	Description	Annual Deaths	Probability of Premature Death* Annual	Probability of Premature Death* Lifetime	Level of Government Activity
D-1	087	Relapsing fever	0.33	.001	.1	Significant
D-2	257	Testicular dysfunction	0.33	.001	.1	Significant
D-3	007.1	Giardiasis	0.67	.003	.2	Significant
D-4	470	Deflected nasal septum	0.83	.004	.3	Significant
D-5	110	Dermatophytosis	1.17	.005	.4	Significant
D-6	071	Rabies	1.50	.007	.5	Significant
D-7	652	Malposition and mal-presentation of fetus	1.83	.008	.6	Significant
D-8	684	Impetigo	2.33	.010	.7	Significant
D-9	122	Echinococcosis	3.17	.014	1.0	Significant
D-10	744	Congenital anomalies of ear, face, and neck	3.83	.017	1.2	Significant
D-11	072	Mumps	4.67	.020	1.5	Significant
D-12	256	Ovarian dysfunction	6.67	.029	2.1	Significant
D-13	522	Acute apical periodontitis of pulpal origin (522.4), and periapical abscess without sinus (522.5)	9.17	.040	2.9	None
D-14	056	Rubella	10.33	.045	3.2	Significant
D-15	604	Orchitis and epididymitis	11.17	.049	3.5	Significant

Note: (*) — Chances per million.

EXHIBIT 3-6:

DETERMINATION OF GOVERNMENT ACTIVITY FOR DISEASE RISKS (Continued)

Risk Number	International Classification Category	Description	Annual Deaths	Probability of Premature Death* Annual	Probability of Premature Death* Lifetime	Level of Government Activity
D-16	460	Acute nasopharyngitis	14.83	.06	4.6	Significant
D-17	004	Shigellosis	20.83	.09	6.5	Significant
D-18	216	Benign neoplasm of skin	24.33	.11	7.6	Significant
D-19	017	Tuberculosis of other organs	34.00	.15	10.6	Significant
D-20	015	Tuberculosis of bones and joints	37.67	.16	11.8	Significant
D-21	220	Benign neoplams of ovary	42.67	.19	13.4	Significant
D-22	027.0	Listeriosis	63.00	.27	19.7	Significant
D-23	483	Pneumonia due to Eaton's agency, mycoplasms, and pleuropneumonia-like organisms	80.17	.35	25.1	Significant
D-24	536	Disorders of function of stomach	96.17	.42	30.1	Significant
D-25	295	Schizophrenic psychoses	126.66	.55	39.7	Significant
D-26	737	Curvature of spine	180.83	.79	56.6	Significant
D-27	595	Cystitis	226.50	.98	70.9	Significant
D-28	323	Encephalitis, myelitis, and encephalomyelitis	268.50	1.17	84.1	Significant
D-29	036	Meningococcal infection	361.67	1.57	113.2	Significant
D-30	570	Acute and subacute necrosis of liver	457.00	1.99	143.1	Significant

Note: (*) — Chances per million.

EXHIBIT 3-7:
GOVERNMENT ACTIVITY FOR DISEASES, BY INTERVALS OF RISK

Percentages of categories are shown in parentheses; numbers may not add due to rounding.

Lifetime Probability of Premature Death (chances per million)	Number of Categories	Level of Government Activity		
		None	Status Quo	Significant
0.1 to 1	9	0 (0)	0 (0)	9 (100)
1 to 10	9	1 (11)	0 (0)	8 (89)
10 to 50	7	0 (0)	0 (0)	7 (100)
50 to 500	5	0 (0)	0 (0)	5 (100)
TOTALS	30	1 (3)	0 (0)	29 (97)

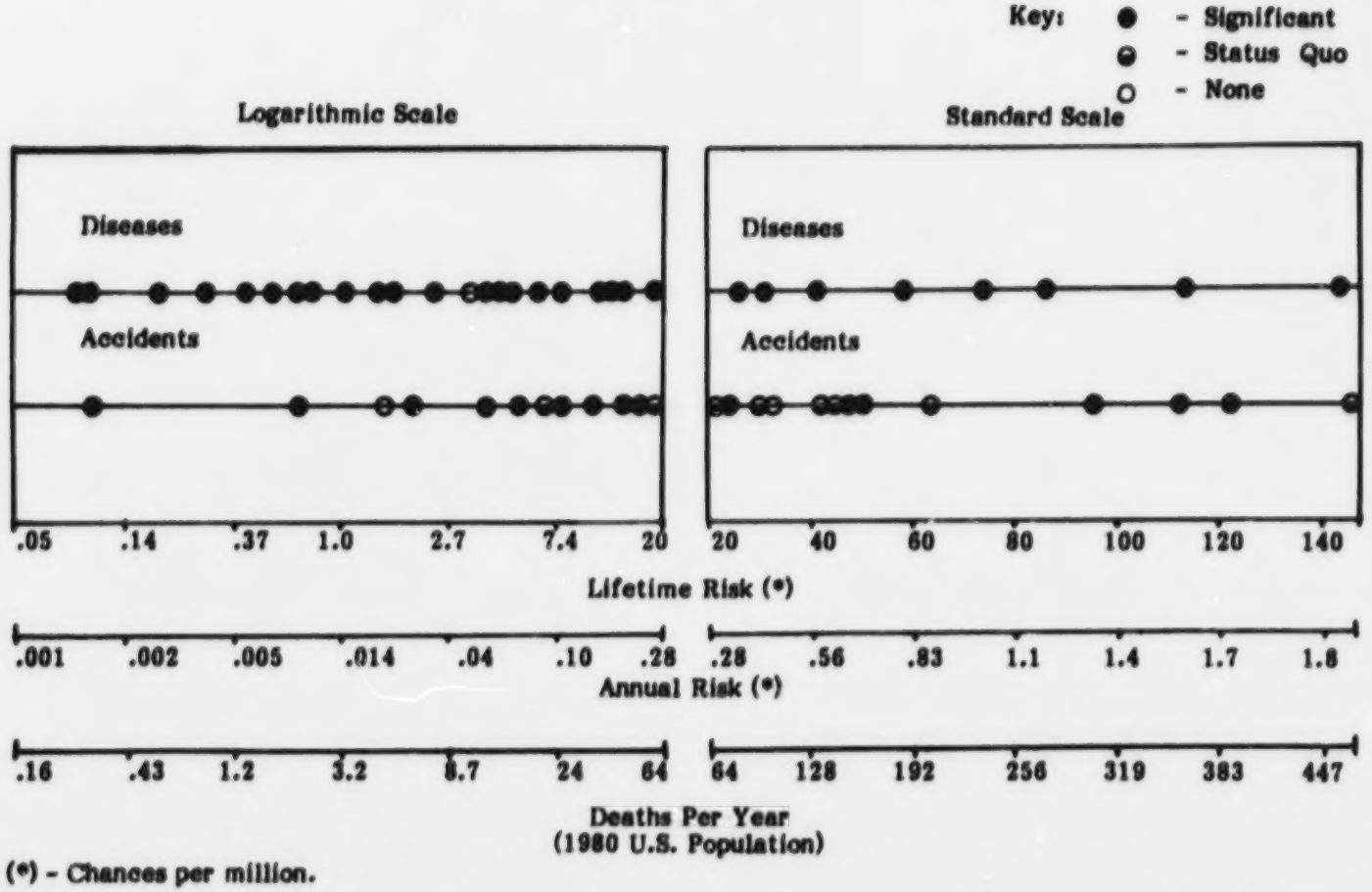
3.4 Search for Evidence of a *De Minimis* Threshold

The results of our assessment of accident and disease risks are presented in Exhibit 3-8. In this exhibit, completely filled circles denote risks which were found to have significant government risk-reduction activity, half-filled circles indicate a status quo determination, and open circles denote risks for which no government activity could be identified. The apparent random distribution of the eleven risk categories without significant government activity designed to reduce the risk and the finding of only three risk categories with no government activity designed to reduce or limit the risk suggest that the lack of activity for these categories is not due to the existence of a *de minimis* threshold within the range of risks under consideration. The statistical analysis presented next formally confirms of this preliminary observation.

A search for the existence of a *de minimis* threshold within the range of risks considered in this study may be performed statistically via the logistic regression (logit) model. The hypothesis of a *de minimis* threshold of risk implies that the probability of risk-reduction activity for a given risk increases with the level of the risk. Although the strict concept of a "threshold" implies that the probability of activity goes from zero to one within a narrow interval which includes the threshold, the many uncertainties which enter into actual risk-managment decision-making tends to widen this interval, and a single location for the "threshold" is not to be expected. A revealed *de minimis* threshold may be established by demonstrating that the probability of risk-reduction activity rises noticeably within a risk interval. This may be referred to as the revealed threshold interval.

The logistic regression model may provide statistical evidence for or against the existence of a threshold interval by expressing the probability of action as a function of the level of risk. The mathematical form of logistic model ensures that the estimated probability function will remain between zero and one for all values of the level of risk. Exhibit 3-9 explains the hypothetical use of the logistic model to provide evidence for the existence of a threshold. Without uncertainty, the threshold would imply that the probability of societal activity would follow curve A, a sudden rise from zero to one. Curve B is obtained when there are underlying uncertainties obscuring the threshold. In this case, the noticeable rise of the curve in the threshold interval provides sufficient evidence for the existence of a threshold. If the empirical data is fitted by curves C or D, this provide evidence that there is no threshold in the range of the data. Given

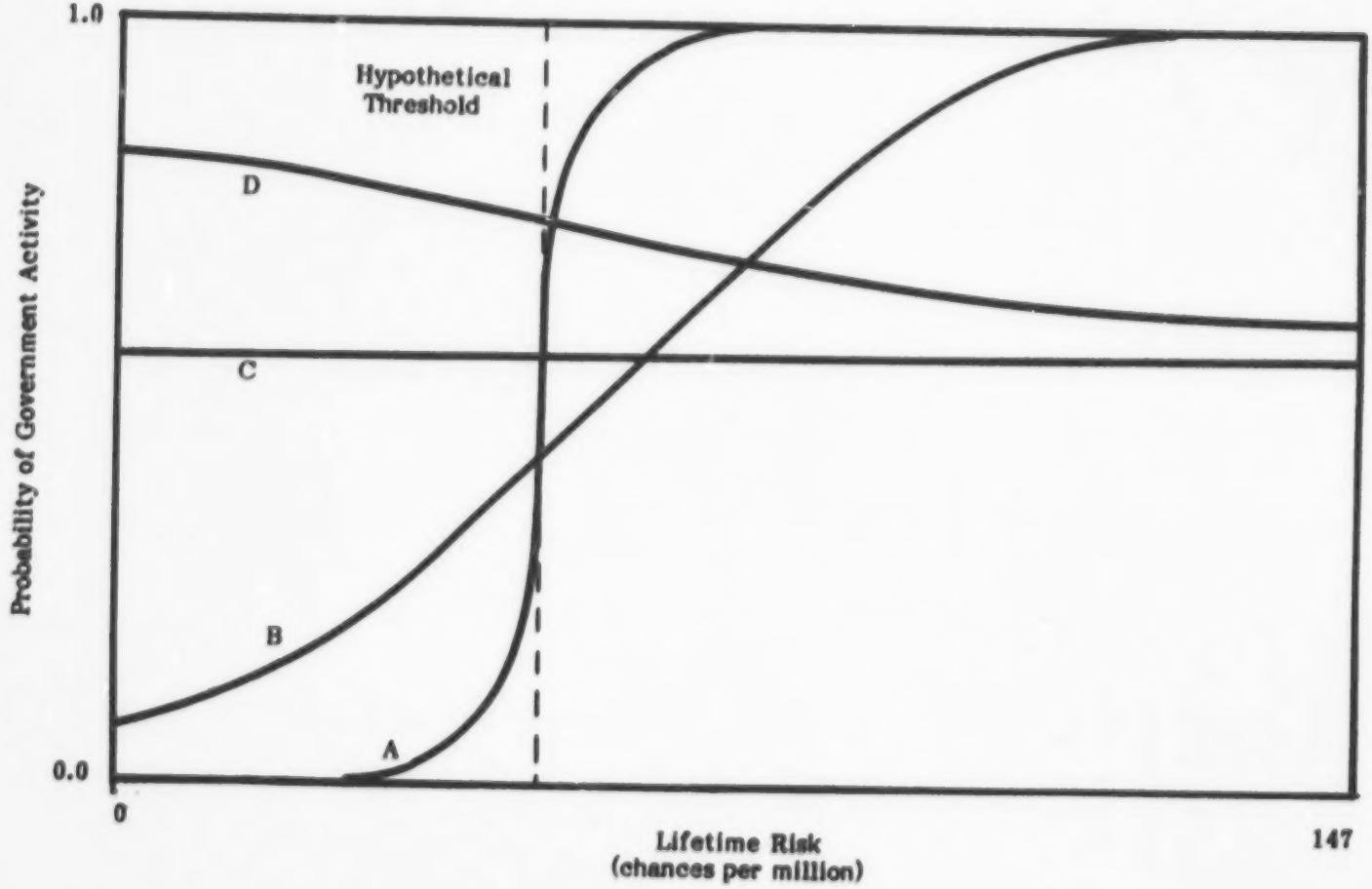
EXHIBIT 3-8:
GOVERNMENT ACTIVITY FOR ACCIDENTS AND DISEASES VERSUS LEVEL OF RISK



Note: (*) - Chances per million.

EXHIBIT 3-9:

HYPOTHETICAL PLOTS OF PROBABILITY OF GOVERNMENT ACTIVITY VERSUS LIFETIME RISK



curve C, it is likely that the threshold lies further to the left, while curve D provides little evidence for any threshold.

The results of the logistic regression analyses are present in Exhibit 3-10. Regressions were estimated for accidents and diseases separately, and again for accidents and diseases combined. The combined results were obtained by fitting the logistic model equation:

$$E(P_i) = f(a + b\,Z_i + cR_i), \qquad (1)$$

where the dependent variable is P, the probability of risk-reduction activity, and the independent variables are Z_i, an indicator which equals one for diseases and zero for accidents, and R_i, which denotes the lifetime risk level. The function f(x) is the logistic function, $f(x) = (1 + e^{-x})^{-1}$. The combined regression was run for the 55 accident and disease risks by assigning all cases with evidence of government risk-reduction activity a response level of 1, and cases with no activity or a status quo[1] determination, a response level of 0. Separate regression results for accident and disease risks were obtained using similar models with no indicator variable. The first coefficient, a, estimates the intercept of the model; and the third coefficient, c, estimates the effect of increasing the level of risk, i.e. the slope of the function. In the combined model, the indicator coefficient, b, estimates the difference in activity level between accidents and diseases.

The t-statistics shown in parentheses in Exhibit 3-10 indicate that the slope coefficients for all three models are insignificantly different from zero, i.e. there is no significant tendency for the probability of activity to change with the level of risk in the interval covered by the observations. The results shown in the exhibit also suggest that the difference in the level of activity for accidents and disease is statistically significant, since the t-statistics for the indicator variable coefficient exceeds the required level.

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[1] Assigning the status quo categories a response level of 1 produces no significant changes in the results.

EXHIBIT 3-10:

LOGISTIC REGRESSION RESULTS FOR ACCIDENTS, DISEASES AND COMBINED

Data	Estimated Coefficents[a]		
	Indicator[b]	Constant	Lifetime Probability
Accidents (N = 25)	—	0.56 (1.01)	-.0042 (.42)
Diseases (N = 30)	—	2.76 (2.31)	.091 (.43)
Combined (N = 55)	2.93 (2.66)	0.48 (.90)	-.0021 (.22)

Note: (a) - t-statistics shown in parentheses.
(b) - Indicator equals one for diseases, zero for accidents.

The estimated logistic functions for the combined regression and the separate regressions are graphed in Exhibits 3-11(a) and 3-11(b), respectively. Examination of the results of the combined regression in Exhibit 3-11(a) shows that the estimated probability of government activity for disease risks is very flat over the entire range, while the response function for accidents falls slightly at higher levels of risk. This perverse slope was noted above as being insignificant by analysis of the t-statistics.

The separate regression results, shown in Exhibit 3-11(b), also show no significant slope in the interval of observed risks. These results indicate that there is no significant tendency for lower level risks to be associated with a lower probability of activity in the interval under consideration, which would be expected if the interval contained the *de minimis* threshold.

EXHIBIT 3-11(a):

PLOT OF PROBABILITY OF GOVERNMENT ACTIVITY VERSUS LIFETIME RISK, ESTIMATED JOINTLY FOR ACCIDENTS AND DISEASES USING A DUMMY FOR THE DIFFERENCE IN LEVEL

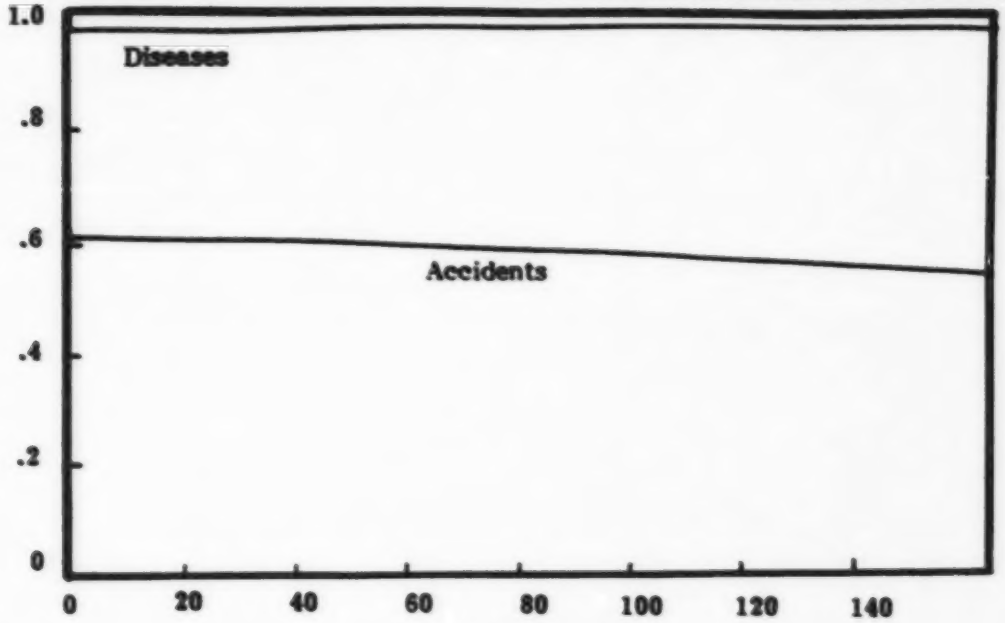
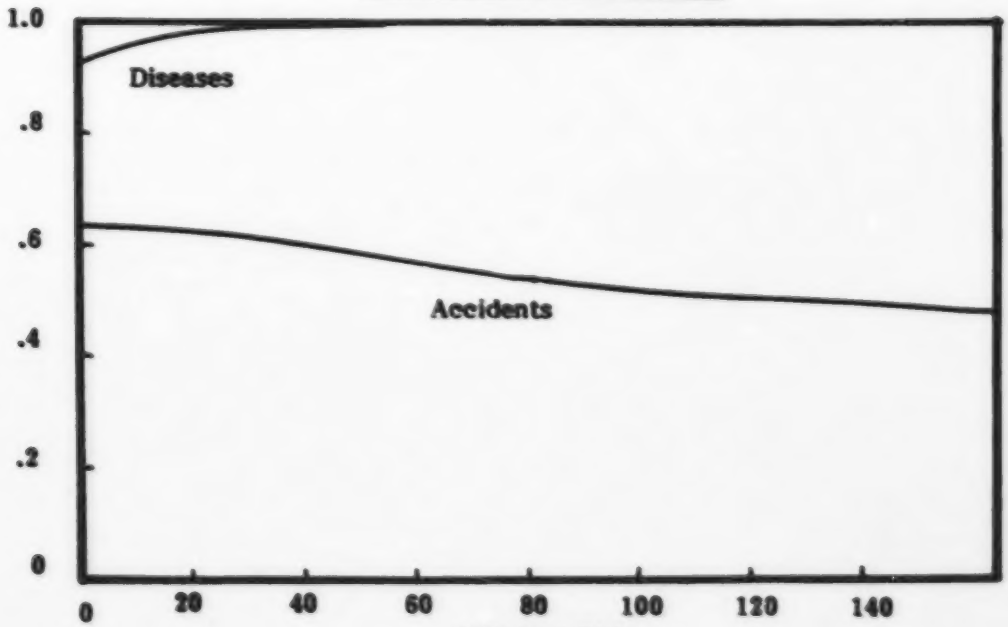


EXHIBIT 3-11(b):

PLOT OF PROBABILITY OF GOVERNMENT ACTIVITY VERSUS LIFETIME RISK, ESTIMATED WITH SEPARATE REGRESSIONS FOR ACCIDENTS AND DISEASES



IV. CONCLUSIONS

Our results show no noticeable decline in society's intent to reduce risk down to a lifetime risk level of 0.1 in a million, under conditions when the risk is visible and where there are no ulterior benefits derived from accepting the risk. We conclude, therefore, that if a *de minimis* threshold exists for societal risks, it is below a lifetime risk level of 0.1 in a million.

Our ability to push this upper bound for the *de minimis* threshold to even lower levels is limited by the availability of accurate mortality data. For a constant lifetime risk of 0.1 in a million, we expect only one death due to this cause every three years in the U.S. population. Reducing this risk level by a factor of ten would result in one expected death every thirty years, which would not be measurable with current national mortality data bases.

APPENDIX

EXPOSURE TO RADIATION (E926)

CHARACTERIZATION OF RISK

This risk category includes deaths from radiofrequency radiation, infrared heaters and lamps, visible and ultraviolet light sources, lasers, radioactive isotopes, and x-rays and other electromagnetic ionizing radiation. This category excludes atomic power plant malfunction in water transport, misadventure to patient in surgical and medical procedures, use of radiation in war operation, and abnormal reaction to radiation treatment without mention of misadventure. During the given time period, two deaths were reported, both in 1980. One death was attributed to visible and ultraviolet light; the other death was categorized under other specified. It should be noted that only deaths due to prompt effects of radiation are included in this category.

QUANTIFICATION OF RISK

Average Deaths/Year (1975–1980) = .33
Deaths Per Year/Million 1980 Population = .0014
Lifetime Risk for an Individual = .10/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing.

Reducing the Risk: The Food and Drug Administration (FDA) has taken a lead role in acting to reduce the risks associated with ultraviolet light. This agency's campaign has involved a number of actions which target the two worst sources of ultraviolet light: natural sunlight and sun lamps/tanning booths. Concerns about sunlamps date back to 1975 when the Food and Drug Administration added them to the list of electronic products which require manufacturers to submit reports on design and emission characteristics.

The FDA has published a large quantity of consumer-related literature informing the public of the hazards associated with sun-bathing and sun lamps/tanning booths. This agency has also addressed other hazards associated with ultraviolet light such as those from mercury vapour and metal hallide lamps and fluorescent lights. Ultraviolet light is the catalytic component in the tanning process and in medical treatment, but it is also the element that poses the health risk.

The FDA has imposed standards for manufacturers of sunlamps/tanning booths and similar ultraviolet equipment. The following standards were mandated in 1980:

- Performance requirements
  - ratio of irradiance within wavelength range
- Timer on equipment
- Control for termination of radiation emisssion
- Protective eyewear
- Labelling requirements
- Test for determination of compliance
- Instructions to users.

Since sunlamps and similar ultraviolet light equipment are used for certain medical treatment, such products are also subject to medical device requirements by the FDA.

There are no mandatory standards to safeguard against the dangers associated with radiofrequency radiation. The American National Standards Institute publishes standard which may be voluntarily adopted. Over the past year microwave radiation, specifically from high-powered radio and television transmitters, has been under inquiry; proposed rulemaking is underway. No mandated standards exist for infrared heaters and lamps. Standards for x-ray machines are in place, and manufacturers must follow a regulatory standard for lasers. The Nuclear Regulatory Commission has established rules for the use, manufacturing, and licensing of by-product materials such as radioactive isotopes. Rules for export and import of such by-products have also been established.

EXPLOSION, FIRE, OR BURNING IN WATERCRAFT (E837.3)

CHARACTERIZATION OF RISK

The watercraft included in this risk cateogry are recreational vessels excluding vessels used for transportation, military vessels and vessels used in industry or business. This risk category consists of accidents associated with explosion, fire, or burning on watercraft, i.e., explosions of boilers on steamships and fuel-related or localized fires on smaller craft. This category does not include fatalities associated with drownings as a result of explosions or deaths due to fires which resulted from collisions. It has been estimated that 35.2 million people participated in recreational boating activities in 1976.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 2.2
Deaths Per Year/Million 1980 Population = .0094
Lifetime Risk for an Individual = 0.68/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risks.

Reducing the Risk: The U.S. Coast Guard regulates watercraft safety. Boating safety regulations are promulgated and enforced under the Federal Boat Safety Act of 1971. This Act specifically identifies many areas of water safety regulation, three of which require boat manufacturers to comply with standards that are directed toward reducing the risk of fire, explosion, or burning on watercraft. Regulations promulgated in 1977 addressed the following required fire safety standards:

Electrical Systems

- Ignition testing in explosive atmosphere is required.

- Electrical components are required to be isolated from fuel or fuel vapours.

- Grounding is required if boat has more than one gasoline engine.

- Batteries and conductors are required to meet specific standards.

Fuel Systems

- Fuel Tanks are to be tested for leaks. Required materials, labelling, and installation procedures are specified.

- Required standards are specified for fuel tank, fill systems, fuel pumps, carburetors, fuel stop valve, clips, straps, and hose clamps.

- Required testing procedures are to be followed, i.e., fire test, static pressure test for fuel tanks, etc.

Ventilation

- A powered ventilation system or natural ventilation system is required of each compartment in boat that has a permanently installed gasoline engine.

Finally, educational/informational programs have been set up by the U.S. Coast Guard to teach water safety measures for recreational boating; part of the instruction focuses specifically on safety procedures to reduce the risk of fire, explosion, and burning on watercraft.

RAILWAY ACCIDENTS INVOLVING COLLISION WITH PEDAL CYCLIST (E801.3)

CHARACTERIZATION OF RISK

This risk category addresses collisions of railway cars with bicyclists, tricyclists, or any non-motorized pedal cyclist. This accident is a sub-category within the larger accident group of railway accidents involving collision with other objects. However, for the purposes of this study, which excludes transportation-related risks, this category is considered a risk connected with the recreational activity of bicycling.

QUANTIFICATION OF RISK

Average Deaths/Year (1975–1980) = 4.2
Deaths Per Year/Million 1980 Population = .018
Lifetime Risk for an Individual = 1.3/Million

GOVERNMENT ACTIVITY

Conclusion: There is no significant government activity directed towards reducing this risk.

This accident group is somewhat obscure and deaths caused by this accident are rare. Railroad operating rules are enforced by individual railroad systems, and some Federal railroad operating requirements are in existence. Regulations are inplace to safeguard against accidents at highway safety crossings; however, collision accidents with cyclists are not specifically considered in highway safety crossing design.

ACCIDENTAL POISONING FROM FOODSTUFFS AND POISONOUS PLANTS (E865)

CHARACTERIZATION OF RISK

This risk category includes accidental ingestion of any meat, fish, or shellfish poisoned with food additives or contaminants, and any plants, berries, and fungi unintentionally eaten by a child. This category excludes food poisonings and toxic reactions from venomous plants. Over 5 percent of all poisonings reported for children under 5 years old were caused by accidental ingestion of plants.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 6.7
Deaths Per Year/Million 1980 Population = .03
Lifetime Risk for an Individual = 2.1/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: The U.S. Department of Agriculture (USDA) is the cognizant agency for the safety of meat and poultry products. USDA inspectors are authorized to prohibit any use of packaging material that may allow meat or poultry to become adulterated or contaminated. The Food Safety Inspection Service of the USDA has established a meat and poultry hotline. This hotline enables consumers to directly and immediately receive answers to questions about the safety, wholesomeness, or labelling of a meat or poultry product. In general, this service functions to ensure that the Federal Meat Inspection Act and the Poultry Products Inspection Act are enforced.

Federal agencies such as the Food and Drug Administration (FDA) have poison programs which function as clearinghouses for information rather than control centers. For

example, information on the potential dangers of food additives such as saccharin and monosodium glutamate can be obtained from the FDA. The FDA also inforces standards under the Code of Federal Regulations which establish the materials and processes permitted for food packaging. The FDA also has sanitation standards for manufacturers called Food Manufacturers Practices. Canned goods are regulated under such standards.

States provide poison control hotlines and information centers. Each designated poison control center must be classified and certified by the American Association of Poison Control Centers. Some States may receive private grants for poison control centers in addition to the State funding. Poison centers emphasize control of food and poisonous plants.

ACCIDENTAL POISONING BY CLEANSING AND POLISHING AGENTS, DISINFECTANTS, PAINTS, AND VARNISHES (E861)

CHARACTERIZATION OF RISK

This risk category includes poisonings by detergents, shampoos, and other soap products as well as by cleansing and polishing agents, disinfectants, and other household products. Over 15 percent of all poisoning reported for children under five years are due to accidental ingestion of a cleansing or polishing agent.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 10
Deaths Per Year/Million 1980 Population = .042
Lifetime Risk for an Individual = 3.0/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: In the category of cleansing and polishing agents, the most significant activity related to poison control is the Poison Prevention Packaging Act of 1970. This Act targets the child population but functions in general to safeguard against poisonings from household substances containing hazardous substances such as methyl alcohol, sulfuric acid, ethylene glycol, etc., and including substances such as furniture polish, paint solvents, and the like. Poison prevention packaging plans are on-going within the Consumer Product Safety Commission. Since the Packaging Act went into effect in 1970, most products are currently properly packaged. Therefore, enforcement of proper packaging has been less active than it has been in the past. In products with detrimental health hazards, product bans may be enforced. Under the Consumer Product Safety Act, paints with lead contaminants have been banned.

Poison control centers, located throughout the United States, are not Federally funded. Each designated center must be classified and certified by the American Association of Poison Control Centers and is funded on the State level. In years past there was greater Federal involvement in poison prevention. Currently, poison control is handled almost exclusively on the State level. The Food and Drug Administration houses a Division of Poison Control. In addition, within the 1984 Operating Plan of the U.S. Consumer Product Safety Commission, a poison prevention program was established.

ACCIDENTAL POISONING BY CORROSIVES AND CAUSTICS NOT COMPONENTS OF DISINFECTANTS (E864)

CHARACTERIZATION OF RISK

This risk category includes accidental poisoning by corrosives and caustics excluding those corrosives found as a component of disinfectant. Burns resulting from caustics and corrosives are included in Accident Risk 21, and are excluded from this category.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 18
Deaths Per Year/Million 1980 Population = .077
Lifetime Risk for an Indiviudal = 5.5/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: Under the authority of the Code of Federal Regulation substances named in the Federal Caustic Poison Act are required to bear the signal word "poison." Such caustics include any preparation with hydrochloric acid, sulfuric acid, nitric acid, carbolic acid, oxalic acid, acetic acid, hypochlourous acid, potassium hydroxide, sodium hydroxide, silver nitrate, and ammonia water. As indicated in the Code, the Consumer Product Safety Commission concluded that the absence of the designation "poison" would indicate to the consumer a lesser hazard and that such would not be in the interest of the public health.

Federal involvement in poison prevention in the form of information gathering takes place at the Food and Drug Administration.

Poison control centers are located throughout the United States and must be classified and certified by the American Association of Poison Control Centers. State monies are the means for funding the centers with private grants occassionally supplementing the budgets.

ADVERSE REACTION TO ANTIBIOTICS (E930)

CHARACTERIZATION OF RISK

This risk category includes all antibiotics such as penicillin, anti-fungal antibiotics, the tetracycline group, and the remainder of the antibiotic groups. According to the National Institutes of Health, penicillin is probably the most common cause of drug allergies, with one in every 50 penicillin-takers suffering from an adverse reaction.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 22.5
Deaths Per Year/Million 1980 Population = .098
Lifetime Risk for an Individual = 7/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed toward maintaining the status quo.

Maintaining the Status Quo: Research conducted on antibiotics has primarily focused on penicillin. Penicillin research has decreased in the last twenty years due to the wealth of research done in the 1960's. Study of the adverse reaction to antibiotics has been a peripheral issue to the study of antibiotics in general. Similarly, clinics and programs which receive federal funds, e.g., the National Institutes of Health and Johns Hopkins, have been established to study and address the larger topic of antibiotics, not solely adverse reactions to antibiotics.

ACCIDENT CAUSED BY CONTROLLED FIRE NOT IN BUILDING OR STRUCTURE (E897)

CHARACTERIZATION OF RISK

This risk category includes controlled fire which results in deaths due to burns from the flame of a bonfire, open grill, or trash fire. Deaths resulting from ignition of clothing, uncontrolled trash fire, or conflagration are specifically excluded.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 24
Deaths Per Year/Million 1980 Population = .10
Lifetime Risk for an Individual = 7.5/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: Fire Prevention Programs are in place at the Federal Emergency Management Agency, the National Fire Protection Association, the U.S. Fire Administration, the U.S. Forest Service of the U.S. Department of Agriculture, and on State and local levels. National campgrounds and other Federally-owned land are controlled by fire protection regulation. These regulations govern how grills and similar equipment are to be used on Federal grounds. In addition, these regulations have authority over any controlled fire on the property.

State and local authorities have jurisdiction in regard to enforcing safety measures for open, controlled fire on private property.

CATACLYSMIC EARTH SURFACE MOVEMENTS AND ERUPTIONS (E909)

CHARACTERIZATION OF RISK

This risk category includes avalanche, earthquake, volcanic eruption, landslide, mudslide, tidal wave, and similar natural disasters. Warning and preparedness programs are in place to reduce the number of deaths associated with this risk category.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 29
Deaths Per Year/Million 1980 Population = .13
Lifetime Risk for an Individual = 9.1/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: The U.S. Geological Survey is taking a lead role in reducing the risks associated with earthquakes and volcanoes. This agency has a Volcano Hazards Program and an Earthquake Hazards Reduction Program. Twenty-two Federal agencies are working in conjunction with the U.S. Geological Survey on earthquake hazards reduction including the Federal Emergency Management Agency, the National Bureau of Standards, and the National Science Foundation. An Earthquake Hazards Reduction Act was put into effect in 1977, and earthquake safety standards for buildings have been established. Worldwide cooperative earthquake programs have also been created. Since 1980 the U.S. Geological Survey and the Federal Emergency Mangement Agency have co-sponsored six earthquake-related workshops.

No specific program exists that addresses the risk of mudslide and landslide because these risks often occur as secondary disasters to earthquakes or other natural disasters. Collapse of dam is often related to earthquakes or other natural disasters; however, the

Soil Conservation Service within the U.S. Department of Agriculture has a plan for safety of dams. Up until 1983 there was a Department of Tsunami (Tidal Wave) within the National Oceanographic and Atmospheric Agency which provided warnings in the event of a tidal wave.

VENOMOUS ANIMALS AND PLANTS AS THE CAUSE OF POISONING AND TOXIC REACTIONS (E905)

CHARACTERIZATION OF RISK

This risk category addresses poisoning from chemicals released by animals and insects whether by fangs, hairs, spines, tentacles, or other venom apparati, or chemicals released by plants through injection of poisons or toxins into or through skin by plant thorns, spines, or other mechanisms. This category does not address eating of poisonous plants or animals. More people die from bites by the group of insects which include bees, wasps, hornets, yellow jackets and fire ants than by bites from venomous creatures such as rattlesnake. Individuals allergic to insect bites, estimated to be 4 out of every 1,000 people, potentially may suffer fatal reactions to such bites.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 53
Deaths Per Year/Million 1980 Population = .23
Lifetime Risk for an Individual = 17/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: The Federal government through the Food and Drug Administration plays a role in gathering and distributing poison control information. The National Institutes of Health is conducting research directed at toxic insect bites and the medical treatment to remedy the danger. In regard to this risk, educational information is distributed by the Department of Health and Human Services.

Poison Control Centers throughout the United States handle poisonings associated with this risk category. These centers are funded on the State level and must be classified and certified by the American Association of Poison Control Centers. Some private grants occassionally supplement the State funding of these programs.

ACCIDENTAL POISONING BY PETROLEUM PRODUCTS, OTHER SOLVENTS AND THEIR VAPOURS, NOT ELSEWHERE CLASSIFIED (E862)

CHARACTERIZATION OF RISK

This risk category focuses on accidental poisoning by petroleum products, other solvents, and their vapours. These products include petroleum solvents, fuels, cleaners, and lubricating oils.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 55
Deaths Per Year/Million 1980 Population = .24
Lifetime Risk for an Individual = 17/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: Under the Hazardous Substance Act, the Consumer Products Safety Commission, requires proper labelling for all petroleum distillates. The Division of Poison Control within the Food and Drug Administration also has involvement in poison control, functioning primarily as a clearinghouse for poison control information.

Poison control for this small risk category of poisoning is budgeted by individual States. Each designated Poison Control Center must be classified and certified by the American Association of Poison Control Centers. Some centers may receive outside funding from private grants.

FOREIGN BODY ACCIDENTALLY ENTERING BODILY ORIFICE, INCLUDING EYE (E915)

CHARACTERIZATION OF RISK

This risk category includes foreign bodies entering the eye, its surrounding area, and foreign bodies entering any other bodily orifice. However, corrosive liquid entering the eye and aspiration or inhalation of a foreign body into the respiratory tract are excluded. Eye-related accidents represent a large portion of this category, since the eye is a particularly vulnerable area.

QUANTIFICATION OF RISK

Average Deaths/Year (1975–1980) = 59
Deaths Per Year/Million 1980 Population = .26
Lifetime Risk for an Individual = 19/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed towards maintaining the status quo.

Maintaining the Status Quo: No direct programs targeted at reducing the deaths associated with this risk were located, the caveat being occupational regulations. The Occupational Safety and Health Administration does have specific rules for protecting eyes in work-related settings. In settings other than occupational ones, wearing proper eye protection in potentially hazardous circumstances is the responsibility of the individual.

The Consumer Product Safety Commission may suggest that proper eye protection be worn when operating certain appliances; however, this agency has no way of enforcing such standards. Similarly, protecting against foreign bodies entering bodily orifices is the individual's responsibility. It is not uncommon to find that children insert foreign bodies into bodily orifices, e.g., beans in ear, etc. This behavior cannot be controlled or monitored except by the attending adult.

ACCIDENT CAUSED BY EXPLOSION OF PRESSURE VESSEL (E921)

CHARACTERIZATION OF RISK

This risk category includes accidental explosions of pressure vessels such as explosions of boilers, gas cylinders, aerosal cans, automobile tires, pressure cookers, and other pressure vessels of similar construction.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 65
Deaths Per Year/Million 1980 Population = .28
Lifetime Risk for an Individual = 20/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed towards maintaining the status quo.

Maintaining the Status Quo: The Federal government and most State governments accept the American Society of Mechanical Engineers (ASME) Pressure Vessel Code. This code is the accepted protocol and Federal standards have not been established, since this would require enforcement by Federal inspection, and since ASME standards are generally regarded to be effective. The Hazardous Substances Act of the Code of Federal Regulation, enforced by the Consumer Product Safety Commission, does require proper labelling for self-pressurized containers under the penalty of being misbranded. Federal safety standards also exist for automobile tires.

CONFLAGRATION NOT IN BUILDING OR STRUCTURE (E892)

CHARACTERIZATION OF RISK

This risk category focuses on uncontrolled fires in forests and similar natural surroundings, fires in tunnels and transport vehicles not in transit, and fires with grass, hay, or lumber. In 1947 over 10 million acres of wildlands were burned, whereas in 1981 only 3 million acres of wildlands were burned.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 71
Deaths Per Year/Million 1980 Population = .31
Lifetime Risk for an Individual = 22/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: Fire protection activity is divided between State/local government and the Federal government. The Cooperative Forestry Assistance Act permits the State forestry organizations to carry out fire protection programming. The U.S. Forest Service under the United States Department of Agriculture gives support through financial and technical assistance, coordination, review, and audit. The Smokey Bear Program is a well-known and popular national fire prevention program which addresses open, uncontrolled fires. The U.S. Fire Administration establishes mechanisms to promote education programs by the Federal government and fire service departments in a joint effort to reduce the nation's fire losses. In addition, the Federal Emergency Management Agency has a Division of Training and Fire Programs which serves to train and educate Federal, State, and local personnel in fire prevention and control. There is a limited amount of fire prevention research also being conducted.

LIGHTNING

CHARACTERIZATION OF RISK

Lightning deaths included in this risk category focus on the direct effects of lightning. Injuries from the fall of a tree or another object caused by lightning or fire caused by lightning are excluded. Risks associated with lightning are well known and can be reduced through preventative safety measures.

QUANTIFICATION OF RISK

Average Deaths Year (1975-1980) = 100.0
Deaths Per Year/Million 1980 Population = .43
Lifetime Risk for an Individual = 31/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed toward maintaining the status quo.

Maintaining the Status Quo: This category appears to be a risk whereby the government is maintaining the existing prevention programs, not accelerating such programs or initiating any research. Presently, no significant research is being conducted on lightning or on minimizing the risk associated with lightning. The National Oceanic and Atmospheric Administration publishes brochures on lightning safety rules. Basic lightning safety measures are fairly well-known by the general population. The Office of Housing and Urban Development (HUD) does follow some standards in regard to grounding building structures to prevent lightning damages. No Federal regulations exist that require grounding standards, although it is common practice to ground high-rise and similar highly elevated buildings. The national trend towards a greater proportion of the population residing in urban areas protected by large buildings has reduced the exposure to lightning, and death rates have fallen for the past 40 years without significant government intervention.

ACCIDENTAL POISONING BY GAS DISTRIBUTED BY PIPELINE (E867)

CHARACTERIZATION OF RISK

This risk category includes poisoning due to coal gas, liquefied petroleum gas distributed through pipes, natural and manufactured gas, and carbon monoxide from incomplete combustion of piped gas. Gas in this form is widely used throughout the United States.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 103
Deaths Per Year/Million 1980 Population = .45
Lifetime Risk for an Individual = 32/Million

GOVERNMENT ACTIVITY

Conclusion: There is no significant government activity directed towards reducing this risk.

No required standards exist for manufacturers of appliances that use utility gas. However, voluntary standards are, for the most part, adopted by the industry. The American National Testing Institute has developed the standards which the American Gas Association has adopted and uses to certify gas appliances. Compliance, however, is decided by the individual manufacturers. Since, this system of voluntary standards seems to be effective, the Federal government has not intervened to enforce standards. States at their own discretion may require certification of gas appliances, within their building codes.

IGNITION OF HIGHLY INFLAMMABLE MATERIAL (E894)

CHARACTERIZATION OF RISK

This risk category focuses on ignition of highly inflammable material including benzine, gasoline, fat, kerosene, and paraffin. Ignition of clothing from these inflammable materials is included in this category. However, ignition of highly inflammable material with conflagration or explosion is not included.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 136
Deaths Per Year/Million 1980 Population = .59
Lifetime Risk for an Individual = 43/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed towards maintaining the status quo.

Maintaining the Status Quo: According to the Consumer Product Safety Commission, Federal labelling requirements for gasoline have been developed and similar requirements for kerosene are being developed.

Standards for containment of portable flammable and combustible liquid containers have been developed and approved by Underwriter's Laboratory and Factory Mutual. The National Fire Protection Association promulgates the standards for portable liquid containers. The Flammable and Combustible Liquids code includes the following requirements:

- proper labelling;
- reclosable caps on cans;
- materials regulations for cans;

- maximum allowable size of container;
- identifying labels on gasoline and kerosene cans;
- red color for gasoline cans; and
- venting capacity.

This code also includes regulations for design, construction, and capacity of storage cabinets, separate inside storage areas, and other building units that house inflammable liquids. Fire protection is suggested around any such liquids. The National Fire Protection Association calls this a consensus code, being advisory in nature. Local jurisdictions may adopt some, all, or no parts of the code. It is the responsibility of the local fire and police departments to inforce inflammable materials regulations.

ACCIDENT CAUSED BY CUTTING AND PIERCING INSTRUMENTS OR OBJECTS (E920)

CHARACTERIZATION OF RISK

This risk category includes falls on or accidental injuries by the edged, pointed, or sharp surface of cutting and piercing instruments or objects. Included among these items are powered lawn mowers, other powered hand tools, powered household appliances and implements, knives, swords, and daggers, and other hand tools and implements. This category excludes fatalities by animal spines or quills and flying glass due to explosion.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 137
Deaths Per Year/Million 1980 Population = .60
Lifetime Risk for an Individual = 43/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed towards maintaining the status quo.

Maintaining the Status Quo: The Consumer Product Safety Commission has established standards for manufacturers of powered lawnmowers. Voluntary industry standards exist and have been adopted by manufacturers of powered hand tools, powered household appliances, and other hand tools. Because these standards are considered effective, they have been adopted by reference in the Code of Federal Regulations. The Occupational Safety and Health Administration (OSHA) puts out general industry standards for handpowered and other similar tools for occupational use; some of the individual standards are set by the American National Standards Institute (ANSI) and others enforced by the Code of Federal Regulation. Under OSHA's authority, commercial lawnmower standards are set in accordance with ANSI standards.

CATACLYSMIC STORMS AND FLOODS RESULTING FROM STORMS (E908)

CHARACTERIZATION OF RISK

This risk category forms a cross-section of natural disasters including hurricanes, tornadoes, torrential rain, blizzards, floods resulting from these various storms, and similar weather conditions. Such risks are well-known and highly visible. Adequate warnings and preparation can decrease the number of deaths associated with these risks.

It is necessary to examine these weather conditions in a group because government funding for warning systems and prevention measures for severe weather conditions and related emergencies is in aggregate form. This type of funding is more efficient than separate funding for specific weather and emergency conditions, since most of the warning and response measures overlap.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 143.5
Deaths Per Year/Million 1980 Population = .62
Lifetime Risk for an Individual = 45/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: The National Oceanic and Atmospheric Administration (NOAA) and the Federal Emergency Management Administration (FEMA) are the two Federal agencies which are actively involved in monitoring and preparing for severe weather conditions.

NOAA activities include the following:

- National Weather Service (1983 budget $265 million)
  - Severe Weather Branch (1984 budget $150,000, 1980 budget $400,000)

- 350 local weather offices
- 75,000 weather spotters
- 6 million brochures distributed, also films and slides

- National Computer Networks and/Weather Forecast Centers
  - Suitland, MD - Worldwide information network, including satelites
  - Kansas City, KA - Severe Storm Center
  - Miami, FLA - Hurricane Center

FEMA activities include:

- Funding for local emergency preparedness/response obtained from FEMA on matching grant basis.
  - Proposed local systems must meet FEMA specifications.

Long-range plans by the National Weather Service, the Federal Aviation Administration and the Department of Defense include the development of the NEXRAD radar system. This system is partly sponsored by the National Weather Service because it will be capable of detecting severe weather conditions earlier than other radar or spotter networks. The national scope of the weather monitoring activity does not accurately reflect the amount of activity the States and local jurisdictions provide. Most of the severe weather warnings are transmitted to the public from local offices, alerted by severe weather watches issued by the Severe Storm Center of the National Weather Service.

FALL INTO HOLE OR OTHER OPENING IN SURFACE (E883)

CHARACTERIZATION OF RISK

Falls in this risk category include dropping into a cavity, dock, hole, pit, quarry, shaft, swimming pool, tank, well or other such opening. Falls, in general, are a common accident and oftentimes, constitute a substantial risk. Yet, because of varying types and numerous ways of falling in this category, activity to reduce the danger is not uniformly enforced; responsibility is primarily assumed by the private sector.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 145
Deaths Per Year/Million 1980 Population = .63
Lifetime Risk for an Individual = 45/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: The Occupational Safety and Health Administration (OSHA) requires fences for construction sites, mines, quarries, docks, and tanks to protect employees, resulting in the additional benefit of protection for the public. Holes such as manholes for utilities are also regulated. OSHA has also established safety regulations which require that when manhole covers are opened, barricades and cones must be placed around the hole, alerting the public of the danger.

State and local authorities have jurisdiction over establishing further safety measures. In Washington, D.C., in-house guidelines and instructions have been established. The Washington, D.C., Metropolitan Police Department enforces regulations which state that only an employee of the Bureau of Sewer Service within the Department of Public

Works is permitted to open a manhole cover upon the penalty of a $500 fine. In general, private property and industrial site owners are involved in protecting the public against falls into holes. The imminent possibility of law suits or claims is oftentimes incentive for acting to reduce this risk. Holes with high public exposure, such as swimming pools, and construction sites, are controlled on the local or State level. In Washington, D.C., both public and private swimming pools are required to have fences enclosing them and to have lighting. Construction sites in the District of Columbia must be safe to the public, which means construction of fences to enclose them and designation of safe passage routes for pedestrians.

ACCIDENT CAUSED BY HOT SUBSTANCE OR OBJECT, CAUSTIC OR CORROSIVE MATERIAL AND STEAM (E924)

CHARACTERIZATION OF RISK

This risk category includes burning or scalding by hot liquids and vapours, including steam, burning by caustic and corrosive substances, and burning by heat from electric appliances. This category excludes chemical burns resulting from swallowing a corrosive substance, fire caused by these substances or objects, radiation burns, and therapeutic misadventures. Considering the large array of products and circumstances that may produce injury or death within this risk category, such hazards are widespread and difficult to control.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 198
Deaths Per Year/Million 1980 Population = .86
Lifetime Risk for an Individual = 62/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed towards maintaining the status quo.

Maintaining the Status Quo: The Consumer Product Safety Commission (CPSC) enforces a number of standards in regard to caustic and corrosive substances. Ammonia is required to have special labelling by the authority of the Hazardous Substnces Act. Caustic substances are also required to have special labelling and packaging. Some educational/awareness programs by the CPSC are in place. These programs function indirectly to warn users about the hazards of supplemental heating sources, e.g., kerosene heaters. The Home Heating Information Program warns that children should not be allowed to play in the area of supplemental heating sources. No specific educational programs or controls are required of manufacturers of electric heating appliances; however, voluntary standards are followed.

Burns from hot liquids and vapours are not controlled or monitored by any government agency. Since such events would be difficult to regulate, individuals are responsible for their own safety.

HUNGER, THIRST, EXPOSURE, NEGLECT (E901)

CHARACTERIZATION OF RISK

This risk category includes abandonment or neglect of infants and helpless persons, lack of food or water, exposure to various weather conditions, or unqualified privation. However, any such conditions resulting from homicidal intent or from accidents connectdd with transport are not included.

QUANTIFICATION OF RISK

Average Deaths/Year (1975–1980) = 306
Deaths Per Year/Million 1980 Population = 1.33
Lifetime Risk for an Individual = 96/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: The Federal government and State and local governments are active in working to reduce the number of deaths in this risk category. On the Federal level, the United States Department of Agriculture (USDA) is the primary agency involved. Administered by USDA's Food and Nutrition Service, food assistance programs to reduce hunger (and its corrollary of thirst) include the following:

- Food Stamp Program
  - administered on the local level
- Food Distribution Program
  - surplus foods
  - USDA-donated foods

- National School Lunch and School Breakfast Programs
  - cash assistance
  - USDA-donated foods
  - free or reduced-price meals

- Child Care Food Program
  - cash assistance
  - USDA-donated foods
  - technical guidance

- Summer Food Service Programs
  - sponsored by public/private nonprofit school food authorities or by local, municipal, county, or State governments

- Special Supplemental Food Program for Women, Infants, and Children (WIC)
  - operated by local health clinics/authorized health facilities

- Commodity Supplemental Food Program (CSFP)
  - operated by 24 local health agencies in 12 states

- Special Milk Program for Children

- Nutrition Education and Training Program.

These programs address family nutrition concerns, special nutrition concerns, nutrition education and training, and human nutrition information services. Programs are administered by the USDA together with State governments and local agencies. In accordance with the Temporary Emergency Food Assistance Act of 1983, a food distribution program is administered by the USDA, giving needy Americans, including low-income and unemployed persons, USDA-donated food for household use.

Programs to reduce deaths due to neglect and exposure are administered, for the most part, on the State and local level. Under the Child Abuse and Neglect Laws, mandated in 1977, each State must apply for Federal funds. Matching and reimbursable Federal funds are available for some programs in addition to funding by State and local authorities. Funding protocol varies among States.

Programs which attempt to aid the indigent "street people" are administered on the State and local level. No umbrella agency in the Federal government oversees such services. In the District of Columbia, the Department of Human Services (within the District Government) has programs for the helpless. Housing facilities exist for men, women, and families. These arrangements are funded by the National Council of Churches, or by local funds, depending on the facility. Some Federal participation is offered for homeless families.

ACCIDENT CAUSED BY IGNITION OF CLOTHING (E893)

CHARACTERIZATION OF RISK

This risk category addresses ignition of clothing from controlled fire in a private dwelling or other buildings or structures, and from other sources. Sources of ignition include bonfire, trashfire, welding torches, cigarettes, candles, blowtorches, etc. Ignition of clothing from highly inflammable materials such as kerosene or gasoline (Accident risk 17)and ignition of clothing with conflagration are not included. The young and the elderly appear to be at the greatest risk for ignition of clothing, and ignition of daywear happens twice as often as ignition of sleepwear.

QUANTIFICATION OF RISK

Average Death/Year (1975-1980) = 359
Deaths Per Year/Million 1980 Population = 1.56
Lifetime Risk for an Individual = 112/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed toward reducing this risk.

Reducing the Risk: In 1973 the Consumer Product Safety Commission (CPSC) adopted a charge given previously to the Federal Trade Commission for enforcement of the Flammable Fabrics Act under the Code of Federal Regulation. By the authority of this Act, clothing and textiles intended to be used as clothing must fulfill particular standards; methods of testing these materials must be monitored; and regular inspections must take place. Under the auspices of this Act there exists a General Wearing Apparel Standard and a Vinyl Plastic Film Standard. The General Wearing Apparel Standard requires articles of clothing to pass a small open flame test. The Vinyl Plastic Film Standard requires a flame test for vinyl plastic film used in wearing apparel, e.g., diapers. In addition, the Code of Federal Regulation contains a standard for the

Flammability of Children's Sleepwear. Since 1972 the CPSC has published an annual flammable fabrics report, and several Federal agencies are conducting in-depth investigations for clothing ignition injuries and fatalities. Educational information for the public is disseminated by the CPSC, and an extensive data base is maintained by this agency.

ACCIDENTS CAUSED BY EXPLOSIVE MATERIALS (E923)

CHARACTERIZATION OF RISK

This risk category includes flash burns and other injuries resulting from explosion of explosive materials, excluding explosions in or on machinery, explosions on any transport vehicle except a stationary motor vehicle, and secondary fires resulting from explosions. The explosive materials defined within this category include fireworks, blasting materials, explosive gases, bombs, and similar materials, and explosions in grain storage, munitions, and like surroundings.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 386
Deaths per Year/Million 1980 Population = 1.68
Lifetime Risk for an Individual = 121/Million

GOVERNMENT ACTIVITY

Conclusion: There is significant government activity directed towards reducing this risk.

Reducing the Risk: The Code of Federal Regulation sets forth the law relating to explosive materials. Within this chapter of the Code, regulations are established for importation, manufacture, distribution, and storage of explosive materials. Specific unlawful acts are established with corresponding penalties. Licenses and user permits are required in order to import, manufacture, or deal in explosive materials.

The Compliance Operations Section of the Bureau of Alcohol, Tobacco, and Firearms enforces the Federal standards for explosives manufacturing and handling. However, States and localities are permitted to have their own explosives regulations; whichever regulation is the most strict in regard to minimizing risks is enforced.

FALL ON SAME LEVEL FROM SLIPPING, TRIPPING, OR STUMBLING (E885)

CHARACTERIZATION OF RISK

This risk category focuses on all falls on the same level due to slipping, tripping, or stumbling. Falls of all types constitute the second highest fatal accident group for all ages. Under 44 years of age falls constitute either last or are not classified as a fatal accident group. However, among the age groups 45 years and over falls rate either the highest or second highest fatal accident group. Persons over 65 years of age account for 82 percent of the fatalities from falls. However, since falls on the same level constitute such a broad category of accidents, regulating or controlling these accidents is difficult.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 470
Deaths Per Year/Million 1980 Population = 2.04
Lifetime Risk for an Individual = 147/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed towards maintaining the status quo.

Maintaining the Status Quo: Minimal indirect government activity is in place to reduce deaths associated with falls. As noted above, the majority of the fatal falls occur in the elderly population. The National Institute of Aging, a division of the National Institutes of Health, publishes educational awareness information on accidents in the elderly population, e.g., falls, and suggests ways to eliminate these risks. Individual states are responsible for safeguarding their sidewalks and streets. In the State of Maryland, counties have jurisdiction over their roads, and the State is responsible for State highways. Roads are resurfaced every six to eight years, sidewalks every twenty

years. Complaints in regard to safety problems are immediately remedied. However, it is evident that no government activity specifically aimed at reducing the number of fatal falls is currently in place. Government programs indirectly address falls, and prevention measures have been developed as a corollary to a much larger accident problem. Due to the liabilities of falling and the high number of falls on private property, the private sector has taken responsibility for attempting to reduce the dangers associated with this risk.

RELAPSING FEVER (087)

CHARACTERIZATION OF RISK

Relapsing fever is an infectious and contagious bacterial disease. Caused by spirochetes, usually Borrelia recurrentia and Borrelia duttonii, it is transmitted to humans by lice and ticks. The disease is characterized by an acute onset with chills and fever, pain in the back and legs, enlargement of the spleen, delirium, and sometimes convulsions. A rapid disappearance of symptoms is followed after an interval of about a week by another paroxysm. This cycle is repeated two to six times. The disease is also known as remittent fever, famine fever, tick fever, and louse fever.

There is no vaccine for relapsing fever. Treatment of the disease includes massive doses of antibiotics, usually penicillin or chlortetracycline. While mortality may reach 60-80 percent in malnourished populations, the disease is seldom fatal in the U.S. where mortality is less than one percent.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 0.33
Deaths Per Year/Million 1980 Population = 0.0014
Lifetime Risk for an Individual = 0.1/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at eliminating this risk.

The Federal government is funding research directed at obtaining more complete information on the basic characteristics of the disease, with the ultimate goal of developing a vaccine to eliminate relapsing fever. Funding for the programs is considered to be small, reflecting the minor public health threat posed by relapsing fever in this country.

TESTICULAR DYSFUNCTION (257)

CHARACTERIZATION OF RISK

Testicular dysfunction is a failure of the testes to develop properly and may include deficient production of sperm, production of nonmotil sperm, poor sperm motility, abnormally shaped sperm, or the presence of an obstruction which prevents sperm from being expelled. In addition, unfavorable secretions from the prostate gland may be involved.

With the except of the presence of an obstruction which may be treated surgically, there is no known treatment for any of the above conditions.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 0.33
Deaths Per Year/Million 1980 Population = 0.0014
Lifetime Risk for an Individual = 0.1/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The federal government is funding a small research effort to improve the understanding, diagnosis, and treatment of testicular dysfunction. It should be noted that mortality is only rarely associated with this condition. When it does occur it is usually the result of a secondary infection.

GIARDIASIS (007.1)

CHARACTERIZATION OF RISK

Giardiasis is a dysentery caused by the presence of the protozoan parasite Giardia lamblia in the small intestine. The protozoan is transmitted by both food and water under unsanitary conditions, and the disease is most prevalent in malnourished populations.

Giardiasis is common in the underdeveloped areas of the world, but occurs only rarely in the United States. The infestation is difficult to treat, thus the primary control is through public health efforts emphasizing strict sanitation.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 0.67
Deaths Per Year/Million 1980 Population = 0.0029
Lifetime Risk for an Individual = 0.2/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is currently funding a moderate research study on Giardiasis. The study is focused on improved treatment methods, more rapid diagnosis, and methods of prevention. There is no attempt to develop a vaccine for the disease, as it is infrequent in the United States and prevention can be sucessfully accomplished through public health efforts.

DEFLECTED NASAL SEPTUM (470)

CHARACTERIZATION OF RISK

The nasal septum is a partition consisting of bone and cartilage covered by a mucous membrane that separates the two nasal cavities. When the septum is deviated, either by injury or malformation, one nasal cavity is smaller than the other. Malformation is sometimes accompanied by thickening caused by spurs and ridges. Deviation of the septum can result in obstruction which causes difficulty in breathing, and in occassional instances is a serious handicap in the drainage of infected sinuses. A deviated septum can aggravate inflamation of the mucous membranes (hypertrophic rhinitis) of the nasal cavities.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 0.83
Deaths Per Year/Million 1980 Population = 0.0036
Lifetime Risk for an Individual = 0.25/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

At present, there is Federal funding of research in the area of congenital deflected nasal septum. The effort is a small one, directed at more rapid diagnosis and improved treatment.

DERMATOPHYTOSIS (110)

CHARACTERIZATION OF RISK

The general term dermatophytosis encompasses a number of related fungal infestations that affect the feet (athlete's foot), the hair or beard (barber's itch), and the nails, scalp and other areas (ringworm). The fungi most freguently involved are trichophyton mentagrophytes, trichophyton rubrum, Microsporum audouini, and Mircosporum canis.

All forms of the disease are characterized by initial lesions of small blisters and the loss or breakup of hair, with subsequent peeling of the skin or thickening of the nails. Severe itching usually accompanies the infestation.

Diagnosis is made on the basis of the typical appearance of lesions and on culture of a specimen. Treatment consists of grisofulvin, an oral antibotic, and topical application of nystatin.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 1.17
Deaths Per Year/Million 1980 Population = 0.005
Lifetime Risk for an Individual = 0.36/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at eliminating this risk.

The Federal government presently funds major research studies on dermatophytosis. Areas of interest include prevention, improved treatment, and more rapid diagnosis. There is an effort to develop a vaccine to eliminate dermatophytosis, as improved treatment is acknowledged to be difficult.

RABIES (071)

CHARACTERIZATION OF RISK

Human rabies is a viral infection, usually transmitted to humans by the bite of a rabid warm-blooded animal. The onset of the disease is characterized by anxiety, apprehensiveness, and the inability to eat or drink. This is followed by paralysis, coma, and death. Without treatment, the disease is almost always fatal; there are only three documented cases of recovery from the disease.

Medical protocals due exist for the treatment of exposed persons. To be effective the immunization treatment must be administered within the incubation period of the disease (which can be as short as ten days). There are few serious side-effects associated with the current treatment, but earlier treatments involved a serious of extremely painful injections.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 1.50
Deaths Per Year/Million 1980 Population = 0.0065
Lifetime Risk for an Individual = 0.46/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at eliminating this risk.

The Federal government is funding research directed at developing a vaccine to eliminate human rabies. Funding for the program is considered to be major. In addition, the Federal government funds major programs to monitor the occurrance of rabies in sylvanic and domestic animals, and to coordinate local programs of control and treatment.

MALPOSITION AND MALPRESENTATION OF FETUS (652)

CHARACTERIZATION OF RISK

Malposition and malpresentation of a fetus includes any circumstance which prevents an uninterrupted natural delivery process. This includes a breach presentation or any other positioning of the fetus that requires forceps delivery or some other sort of intervention in the natural delivery process. The risk encompassed by this category is the risk to the mother, not the risk to the fetus.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 1.83
Deaths Per Year/Million 1980 Population = 0.008
Lifetime Risk for an Individual = 0.56/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

While there is no current funding for research in this area, the Division of Nursing within the National Institutes of Health recently concluded a study of malpositioning and malpresentation of the fetus.

IMPETIGO (684)

CHARACTERIZATION OF RISK

Impetigo is a skin infection caused by Streptococci and/or Staphylococci bacteria. The disease is most common in children and usually involves exposed areas (i.e., lips and nostrils) of the outer epidermal layers of skin. The onset of the disease is characterized by fragile blisters and considerable itching. Eruption of the blisters leaves a honey-colored crust that tends to enlarge. Scars can result if the disease spreads to the dermis.

Impetigo is most prevalent in tropical climates or where unsanitary conditions are found. The disease is not very contagious, except among infants. The disease is seldom serious, but if large areas are infected the disease can spread to the lymph nodes and the kidneys can be injured by toxic bacterial products. In newborns, impetigo is called pemphigus neonatus, and may be fatal.

Treatment of the disease includes antibiotic creams or oral antibiotics.

QUANTIFICATION OF RISK

Average Deaths/Year (1975-1980) = 2.33
Deaths Per Year/Million 1980 Population = 0.01
Lifetime Risk for an Individual = 0.71/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is funding research to prevent impetigo through improved sanitation, and to improve the diagnosis and treatment of the disease. The effort is considered to be average in terms of funding.

ECHINOCOCCOSIS (122)

CHARACTERIZATION OF RISK

Echinococcosis is a tapeworm infestation by Echinococcus granulosus. The lung and the liver are the primary sites of infestation. The disease is rare in the United States but common in the underdeveloped areas of the world.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 3.17
Deaths Per Year/Million 1980 Population = 0.014
Lifetime Risk for an Individual = 0.96/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is funding a small research effort to improve the diagnosis and treatment of echinoccosis.

CONGENITAL ANOMALIES OF EAR, FACE, AND NECK (744)

CHARACTERIZATION OF RISK

Congenital anomalies of the ear, face, and neck result for prenatal viral and bacterial infections that cause embryonic malformation. Congenital anomalies of the ear, face, and neck include cleft palate and lip, hereditary deafness, non-familial congenital deafness, and hereditary anhidrotic ectodermal defect.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 3.83
Deaths Per Year/Million 1980 Population = 0.017
Lifetime Risk for an Individual = 1.2/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal Government funds major research efforts in the area of congenital anomalies of the ear, face, and neck. Specific projects are selected on the basis of general scientific interest. Currently, there is funding for projects in the areas of improved treatment, more rapid diagnosis, and prevention.

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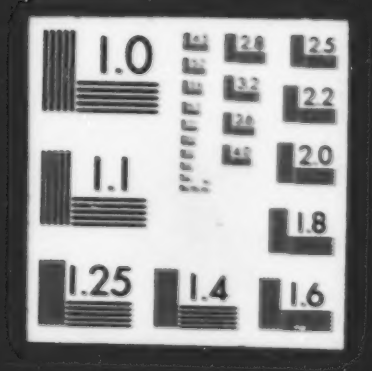

MUMPS (072)

CHARACTERIZATION OF RISK

Mumps is the popular name for parotitis, an acute infectious and contagious viral disease. Mumps is characterized by swelling of the parotid gland and other salivary glands, and frequently the pancreas, ovaries, and testes. After a two to three week incubation period, the disease begins with fever, pain below the ear, and swelling of the parotid gland. The swelling subsides without suppuration with a week, and one attack usually confers immunity.

The disease mosts frequently occurs in youths between the ages of five and 15, and strikes males more frequently than females. In some cases the disease leads to total deafness, and in adult males leads to orchitis (inflamation of the testes) in about 20 percent of all cases. Mumps can also cause inflammation of the meninges of the brain and spinal column.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 4.67
Deaths Per Year/Million 1980 Population = 0.02
Lifetime Risk for an Individual = 1.4/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at eliminating this risk.

The Federal government is funding research to develop a more effective mumps vaccine.

OVARIAN DYSFUNCTION (256)

CHARACTERIZATION OF RISK

Ovarian dysfunction includes hyperestrogenism, Stein-Leventhal Syndrome, primary and secondary amenorrhea, oligomenorrhea, hypomenorrhea, and hypermenorrhea. Ovarian dysfunction may be caused by infection, or result from obstruction or emotional disorders. Hypofunction can delay the onset of menstruation and cause fertility reduction or loss.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 6.67
Deaths Per Year/Million 1980 Population = 0.029
Lifetime Risk for an Individual = 2.0/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government funds major research efforts in the area of ovarian dysfunction. These projects are directed at more rapid diagnosis, improved therapy, and overall prevention. Much of the research centers on understanding the role of hormonal production levels on all types of dysfunction.

ACUTE APICAL PERIODONTITIS OF PUPAL ORIGIN AND PERIAPICAL ABSCESS WITHOUT SINUS (522)

CHARACTERIZATION OF RISK

Acute apical periodontitis and periapical abcess are caused, most frequently, by pyrogenic bacteria. The tooth decay produced by the bacteria leads to inflamation of the tooth pulp, resulting in pain. If severe abcesses are left untreated, the toxins produced by the bacteria can reach the blood stream, leading to complications.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 9.17
Deaths Per Year/Million 1980 Population = 0.04
Lifetime Risk for an Individual = 2.8/Million

GOVERNMENT ACTIVITY

Conclusion: there is no government activity directed at reducing or eliminating this risk.

No Federally funded research is being conducted to study acute apical periodontitis or periapical abscess.

RUBELLA (056)

CHARACTERIZATION OF RISK

Rubella, popularly known as German measles, is a contagious viral disease characterized by fever, rash, and enlargment of the lymph nodes. The incubation period is from 15 to 18 days. In children there is an abrupt onset; in adults there may be a day of general malaise before onset. The course of the disease begins with a series of pink spots on the face and neck which spread over 24 hours. The rash is accompanied by fever and enlargment of the lymph nodes, and last from 1 to 4 days. Treatment consists of bedrest, and second attacks are rare.

The primary danger of rubella is birth defects. A high percentage of children born to women who have had rubella in early pregnancy develop defects prior to birth. These defects include: congenital malformation of the heart, blindness and other serious sight problems, deafness, and brain damage.

A vaccine for rubella was developed in the late 1960s. It is 93-95 percent effective, and should be given to school age children and women of child-bearing age. If administered within four months of pregnancy, the vaccine itself can cause birth defects.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 10.33
Deaths Per Year/Million 1980 Population = 0.045
Lifetime Risk for an Individual = 3.1/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is funding a very small research effort to improve the distribution of the live-virus vaccine developed more than 10 years ago. The vaccine has gained wide-spread acceptance in the medical community, and wide-spread vaccination of the target groups (children of school age and women of child-bearing age) will reduce the incidence of rubella.

ORCHITIS AND EPIDIDYMITIS (604)

CHARACTERIZATION OF RISK

Orchitis and epididymitis are caused by mumps infection and diplococci bacteria. Both are characterized by inflammation of the testes, a a fever frequently accompanies epididymitis. Orchitis occurs in 20-30 percent of all cases of mumps contracted by males over the age of puberty, but,contrary to popular beleif, seldom results in sterility.

Treatment of orchititis and epididymitis consists of penicillin (or tetracycline or erythromycin) and bedrest.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 11.17
Deaths Per Year/Million 1980 Population = 0.049
Lifetime Risk for an Individual = 3.4/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at eliminating this risk.

The Federal government is funding a moderate research effort to develop a vaccine to eliminate the risk of these diseases. The vaccine is made likely due to recent advances in technology resulting from recent research efforts that made diagnosis easier and antibotic theraphy more effective.

ACUTE NASOPHARYNGITIS (460)

CHARACTERIZATION OF RISK

Acute nasopharyngitis (the common cold) is an acute inflammation of the mucous membranes of the nasopharynx. Opinion on the causitive agent responsible for the disease is mixed; the majority favors filterable viruses, while a minority holds bacteria (streptococci, staphylococci, and influenza) responsible. The disease is characterized by general malaise and nasal discharge, and is frequently accompanied by a fever.

The disease is usually self-limiting, and no special treatment is indicated. However, it can lead respiratory aliments and infection of the middle ear.

The common cold is extremely important econcomically, with more than one-third of industrial absenteeism attributable to colds and respiratory illnesses.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 14.83
Deaths Per Year/Million 1980 Population = 0.064
Lifetime Risk for and Individual = 4.5/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is funding a moderate research program directed at improved understanding of the biology of causitive agent(s) and improved therapy. Some effort is also being directed to the testing of vaccines.

SHIGELLOSIS (004)

CHARACTERIZATION OF RISK

Shigellosis is an intestinal disturbance caused by the Shigella bacteria. The disease, also known as bacillary dysentery, may be asymptomatic, but usually results in mild to severe dysentary.

Treatment consists of the use of various antibotics, and is complicated by the fact that the Shigella bacteria often become resistant to antibiotics. In severe cases it may be necessary to replace fluids and electrolytes.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 20.83
Deaths Per Year/Million 1980 Population = 0.09
Lifetime Risk for an Individual = 6.3/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at eliminating this risk.

The Federal government funds major research efforts directed at developing a vaccine to eliminate shigellosis. It also funds research efforts aimed at more rapid diagnosis of the disease and improved therapy.

BENIGN NEOPLASM OF SKIN (216)

CHARACTERIZATION OF RISK

Benign neoplasms of the skin are of two types: small dome-shaped dermal lesions; and subcutaneous nodules along the course of nerves. The subcutaneous nodules may be knotted, plexiform, or pendulous, and can attain great size. The category of benign neoplasms of the skin includes von Recklinghausen's neurofibromatosis, a congenital disease that afflicts approximately 1 in 3000 people.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 24.33
Deaths Per Year/Million 1980 Population = 0.11
Lifetime Risk for an Individual = 7.4/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government funds major research programs studying malignant epidermal and dermal neoplasms. This research also covers benign neoplasms, as they frequently become malignant with time. If the effort directed at benign neoplasms could be separated from the work on malignant neoplasms, the programs would be fairly small.

TUBERCULOSIS OF OTHER ORGANS (012)

CHARACTERIZATION OF RISK

Tuberculosis of the other organs encompasses tubuclur diseases of the skin and subcutaneous tissue, the adrenal glands, the central nervous system, the neck glands, the digestive tract, the genitourinary system, and the heart and abdominal area. Specific tubucular diseases included in the category include: lupus exodens and vulgaris; erythema nodosum; Bazin's disease; Addison's disease; tuberculosis meningitis; and Scrofula.

Tuberculosis is a contagious disease, caused by the tubercle bacillus. The bacillus can enter the body through inhalation, ingestion (raw milk is a major carrier), or at the site of a skin abrasion.

Treatment is usually sucessful with the antibiotic streptomycin.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 34.0
Deaths Per Year/Million 1980 Population = 0.15
Lifetime Risk for an Individual = 10.3/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The government is funding ongoing research on tuberculosis. While the effort centers on pulmonary tuberculosis, it includes tuberculosis of all organ systems. The effort with respect to other organs is moderate, and centers on improved diagnosis and therapy, and on preventing a rise in the incidence of the disease.

TUBERCULOSIS OF THE BONES AND JOINTS (015)

CHARACTERIZATION OF RISK

Tuberculosis of the bones and joints is a contagious disease caused by mycobacterium tuberculosis. The bacteria, which is most often taken into the body through the ingestion of raw milk, spreads through the body through the lymphatic and/or blood vascular system to the serosal surfaces of the bone and joint. Once the disease reaches the serosal surface, it is characterized by the destruction of the bone surface and the formation of cold abcesses.

Treatment of tuberculosis of the bones and joints includes streptomycin, isonicotinic acid, and paraminosalicylic acid. However, these treatments are less effective aginst tuberculosis of the bones and joints than in other forms of tuberculosis.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 37.67
Deaths Per Year/Million 1980 Population = 0.16
Lifetime Risk for an Individual = 11.5/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

There is currently major Federal funding of research projects to study mycobacterium tuberculosae. However, tuberculosis of the bones and joints is a moderate effort when contrasted to programs directed at pulmonary tuberculosis. The research effort encompasses improved diagnosis and therapy. There is also funding of programs to prevent the incidence of the disease from rising to the previous unacceptable level.

BENIGN NEOPLASM OF THE OVARY (220)

CHARACTERIZATION OF RISK

A neoplasm (or tumor) is a new growth of tissue in a limited area with an abnormal location or structure. Ovarian neoplasms (which are less common than tumors that form in other areas of the reproductive system) are characterized by irregular bleeding and pain between periods or after menopause.

Benign neoplasms of the ovary are treated by surgical removal. Left untreated they can attain great size, and eventually cause death.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 42.67
Deaths Per Year/Million 1980 Population = 0.19
Lifetime Risk for an Individual = 13.0/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

Currently, Federally funded major research projects are being conducted to study ovarian neoplasms. It is difficult or impossible to separate the study of benign from malignant neoplasms, as benign neoplasms frequently become malignant over time.

LISTERIOSIS (027.0)

CHARACTERIZATION OF RISK

Listeriosis includes diseases such as meningitis, meningoencephalitis, and septicaemia caused by Listeria monocytogenes. The Listeria monocytogene bacteria is ubiquitous in nature, affecting rodents, sheep, and cattle as well as man. The disease is not considered to be contageous, but can be transmitted to those who work closely with infected animals.

The disease can attack various locations in the body, including the membranes of the brain meninges, the eye (oculograndular infection), the heart (endocarditis), and the skin.

Untreated, listeriosis of the brain meninges is fatal in 95 percent of all cases. Treatment is with antibiotics, usually penicillin, tetracycline, or erythrocycline.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 63.0
Deaths Per Year/Million 1980 Population = 0.27
Lifetime Risk for an Individual = 19.2/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is funding a small research program to better understand the basic biology of this disease. Listeriosis is not considered to be a major health problem in the United States.

PNEUMONIA DUE TO EATON'S AGENT, MYCOPLASM AND PNEUMONIA-LIKE ORGANISMS (483)

CHARACTERIZATION OF RISK

These forms of pneumonia are caused by a group of micro-organisms known as pleuromneumonia-like organisms(PPLO), including Mycoplasm pneumonea and Asterococcus mycoides. These organisms are considered intermediate between a bacteria and a virus. The symptoms of the disease include inflammation of the lungs and lining of the thoracic cavity, a dry hacking cough, and general aches and pains.

Pleuropneumonia, caused by the Asterococcus mycoides, is the most virulent of this group of diseases and is frequently fatal. However, pleuropneumonia has been eradicated in the United States.

Treatment of these forms of pneumonia is generally with oral tetracycline.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 80.17
Deaths Per Year/Million 1980 Population = 0.35
Lifetime Risk for and Individual = 24.4/Million

GOVERNMENT ACTIVITY

Conclusion: There is government activity directed at reducing this risk.

The Federal government funds major research efforts aimed at more rapid diagnosis and improved treatment of these diseases. It also funds programs to prevent the incidence of these diseases from rising to the previous unacceptable levels.

DISORDERS OF FUNCTION OF THE STOMACH (536)

CHARACTERIZATION OF RISK

Disorders of the function of the stomach include: diarrhea, cancer, gastritis, indigestion, stomachache, ulcers, and vomiting. Many stomach disorders are involved with poor food absorption by the walls of the stomach. Gastritis, an inflammation of the gastric mucosa, includes simple exogenous gastritis with symptoms of nausea, vomiting, and possible hemorrhaging, and acute supperative (phlegmonous) gastritis, a streptococcal infection of the stomach wall. Supperative gastritis is characterized by severe abdominal pain, nausea, vomiting, and extreme tenderness.

Gastroenteritis is a viral infection of the stomach wall. Its symptoms include malaise, nausea, loss of appetite, vomiting, cramps, fever, and a persistent watery diarrhea. A few cases have been reported in which the causitive agent was a bacteria or a protozoan. There is no specific treatment of gastroenterititis.

Gastric ulcers can become malignant. There cause is unknown, but include both infection and emotional strain. Loss of electrolytes from the stomach due to vomiting can prove fatal.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 96.17
Deaths Per Year/Million 1980 Population = 0.42
Lifetime Risk for an Individual = 29.3/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is funding major research programs aimed at prevention, more rapid diagnosis, and improved treatment of these disorders.

SCHIZOPHRENIC PSYCHOSES (295)

CHARACTERIZATION OF RISK

Common types of schizophrenia include: simple schizophrenia in which the person becomes irresponsible; hebephrenic in which the person exhibits disorganized thinking and infantile reactions; catatonic, in which the person exhibit extreme withdrawel alternating with extreme excitment; paranoic, in which the person has dilusions of persecution and behaves erratically; acute, in which the person 's behavior becomes perplexed, afraid, confused, or excited; and chronic-undifferentiated, in which the person shows a conbination of the above symptoms.

In general, schizophrenia will occur from about the age of puberty to age 40. After age 45, the risk of developing the disease is sharply reduced. Schizophrenic psychoses affect less than one percent of the total population, but are responsible for 20 to 25 percent of all admissions to public psychiatric institutions.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 126.66
Deaths Per Year/Million 1980 Population = 0.55
Lifetime Risk for an Individual = 38.5/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is funding major research projects aimed at improving the diagnosis and treatment of schizophrenic psychoses.

CURVATURE OF THE SPINE (737)

CHARACTERIZATION OF RISK

Curvature of the spine is characterized by an abnormal deviation in the position of the backbone or spine. Natural curvature may become abnormally accentuated or obliterated. Major forms of this disease include: scoliosis, lordosis, kyphosis. Scoliosis involves a lateral deviation of the spine accompanied by profound changes in the bony structure. It can be congenital or caused by paralysis of the spinal muscles. Scoliosis affects as many as 2 percent of the population. Lordosis involves an abnormal accentuation of the inward curvature of the spine. Also known as "sway back", its causes include bone deformity, foward tilt of the pelvis, obesity, paralysis of abdominal muscles, and congenital hip dislocation. Kyphosis is an abnormal accentuation of the outward curvature (thoracic) of the spine. The most severe instance of this is the so-called "hunchback" condition. Causes include poor posture, fracture of the spine, tuberculosis of the spine, and softening or collapse of the spine.

Structural scoliosis is a major problem. Treatments range from exercise and spine braces to surgery involving bone grafts.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 180.83
Deaths Per Year /Million 1980 Population = 0.77
Lifetime Risk for an Individual = 55.0/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government funds research programs studing methods of improving the diagnosis and treatments of these conditions.

CYSTITIS (595)

CHARACTERIZATION OF RISK

Cystitis is an acute or chronic inflammation of the urinary bladder. It is usually caused by bacteria, either Escherechia coli, or Proteus vulgaris. Common symptoms of cystitis include increased frequency of urination, a burning sensation, difficulty in urination, low back pain, and a slight fever.

Treatment includes the use of antibiotics and increasing fluid intake.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 226.50
Deaths Per Year/Million 1980 Population = 0.98
Lifetime Risk for an Individual = 68.9/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

The Federal government is currently funding research programs studying the basic biology of this disease, and programs aimed at improving the diagnosis and treatment of this disease.

ENCEPHALITIS, MYELITIS, AND ENCEPHALOMYELITIS (323)

CHARACTERIZATION OF RISK

Encephalitis is an inflammation of the brain while encephalomyelitis is an inflammation of the spinal cord. Myelitis may be either an inflammation of the bone marror (osteomyelitis) or the spinal cord (poliomyelitis). The cause is a viral infection or allergic reaction followed by a viral infection. The virus is generally transmitted to man from arthropods of ticks, and the disease is seasonal with most instances occurring in the summer and early fall.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 268.5
Deaths Per Year/Million 1980 Population = 1.2
Lifetime Risk for an Individual = 82/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at eliminating this risk.

The Federal government is funding research projects seeking to develop a vaccine to prevent the occurrance of these diseases.

CO

MENINGOCCAL INFECTION (036)

CHARACTERIZATION OF RISK

Meningococcal menigitis is a inflammation of the meninges that surround the brain and spinal cord. It can be caused by either the bacteria Neisseria menigitidis or Diplococcus pneumoniae. These agents are usually tra-smitted to the meninges by the blood, but can reach it through infection of nearby organs (eg. the middle ear) or by trauma.

Meningococcal infection is treated with penicillin, but still proves fatal in about 5 percent of all instances. Residual damage, including deafness, blindness, epilepsy, hydrocephalus, paralysis, and mental retardation, results in 10 to 30 percent of all cases.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 361.67
Deaths Per Year/Million 1980 Population = 1.6
Lifetime Risk for an Individual = 110/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at eliminating this risk.

The federal government is currently funding a small to moderate research effort to develop a vaccine to eliminate the risk of meningococcal infections. It is also sponsoring research to improve the diagnosis and treatment of this disease.

ACUTE AND SUBACUTE NECROSIS OF LIVER (570)

CHARACTERIZATION OF RISK

Acute and subacute necrosis of the liver are characterized by the death of liver tissue. This is a condition that can result from many causes, including tuberculosis, alcholism, tumors of the liver or nearby tissue, or infection. It is also caused by a loss of blood supply to the liver.

With liver necrosis, the liver tends to enlarge by producing new healthy cells, and function returns to near normal in many cases.

QUANTIFICATION OF RISK

Average Deaths Per Year (1975-1980) = 457.0
Deaths Per Year/Million 1980 Population = 2.0
Lifetime Risk for an Individual = 139/Million

GOVERNMENT ACTIVITY

Conclusion: there is government activity directed at reducing this risk.

There is currently a major Federally funded program directed at improving the diagnosis and treatment of liver ailments. It should be noted that necrosis of the liver is frequently a symptom of disease activity unrelated to the liver.

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